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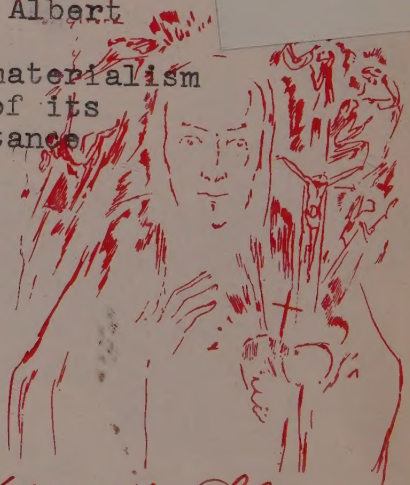

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The History of Materialism

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The History of Materialism

AND CRITICISM OF ITS PRESENT IMPORTANCE

By

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BERTRAND RUSSELL, F.R.S.

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INTRODUCTION:
MATERIALISM, PAST AND PRESENT

MATERIALISM as a theory of the nature of the world has had a curious history. Arising almost at the beginning of Greek philosophy, it has persisted down to our own time, in spite of the fact that very few eminent philosophers have advocated it. It has been associated with many scientific advances, and has seemed, in certain epochs, almost synonymous with a scientific outlook. Accusations of materialism have always been brought by the orthodox against their opponents, with the result that the less discriminating opponents have adopted materialism because they believed it to be an essential part of their opposition. At the present moment, the official creed of one of the largest States in the world is materialism, although hardly any one in the learned world explicitly adheres to this theory. A system of thought which has such persistent vitality must be worth studying, in spite of the professional contempt which is poured on it by most professors of metaphysics.

Lange's *History of Materialism*, here re-issued in "The International Library of Psychology, Philosophy, and Scientific Method," is a monumental work, of the highest value to all who wish to know what has been said by advocates of materialism, and why philosophers have in the main remained unconvinced. The first edition appeared

in 1865, at the height of the period often described as "The materialistic '60's." The preface to the second edition is dated June, 1873. The author died in 1875, before the reaction against materialism had made itself felt. Lange, while very sympathetic to materialism in its struggles with older dogmatic systems, was himself by no means a materialist. He is described by Professor Cohen, in the Preface to the Ninth Edition (1921), as an "apostle of the Kantian view of the world," to which Professor Cohen himself adheres. The description is quite correct. Lange considers that materialism is unable to explain consciousness, and is refuted, on scientific grounds, by the psychology and physiology of sensation, which shows that the world studied by physics is a world dependent on our modes of perception, not a world existing independently on its own account.

It is a commonplace to object to materialism on ethical grounds, since it is supposed to have a deleterious effect on conduct. While energetically repelling many forms of this criticism, Lange nevertheless upholds it in the end, since he regards the economics of the Manchester school and the ruthlessness of modern competition as attributable to a materialistic outlook. This is perhaps the weakest part of his book, in spite of the fact that, unlike most German learned men, he had considerable experience of practical life. In 1861, at the age of 33, he resigned his position as a teacher, and became secretary of the Duisburg Chamber of Commerce. But his position became difficult owing to his radical opinions, which found vent in various directions. He edited a newspaper called *The Rhine and Ruhr Gazette*, and he wrote a book called *Die Arbeiterfrage in ihrer Bedeutung für Gegenwart und Zukunft*, which appeared in the same year as his *History of Materialism*. His industry was

little short of miraculous, for in this same year he published yet another book, *Die Grundlegung der mathematischen Psychologie*—and all this without neglecting the newspaper or the Chamber of Commerce.

In the following year (1866) he went to Switzerland, where he again took up academic work, becoming Professor at Zurich in 1870, and returning to Germany in 1872 as Professor at Marburg. But his experiences in the world of industry and commerce undoubtedly helped to widen his outlook, and to give him an understanding, not always possessed by the learned, of the operation of theories when they pass out into the market-place. He remarks that, in England, philosophers are often statesmen, and, what is still more extraordinary, statesmen are sometimes philosophers. He does not point out how often the mixture is damaging to both, making the statesman too theoretical and the philosopher too practical.

Lange's book is divided into two parts, one dealing with the times before Kant, the other with Kant and his successors. This division shows the very great importance which he attaches to the philosopher of Königsberg—an importance which, perhaps, may seem less as time goes on. Kant's system is intimately bound up with the state of the exact sciences in his day: Euclidean geometry gives the foundation of the transcendental æsthetic, and the Aristotelian syllogism gives the ground for the deduction of the categories. Now that geometry has become non-Euclidean and logic non-Aristotelian, Kant's arguments require restatement; to what extent this is possible, is still a moot question. To the present writer, the first half of Lange's book appears considerably better than the second, because it is less affected by the author's views on matters which are still undecided. In the periods before Kant, his critical

judgment is extraordinarily sound. The account of Greek atomism, the analysis of Plato's influence for good and evil, are admirable. The combination of scientific materialism with theological orthodoxy in seventeenth-century England, and its contrast with the revolutionary materialism of eighteenth-century France, are set forth with a nice historical sense. But it is always a very difficult task to see one's own time in historical perspective. Apart from philosophical predilections, there is difficulty in disentangling what is important and permanent in the purely scientific work of one's own generation. The problems which occupied the men of science sixty years ago were very different from those of the present day, and it was impossible to know which of them would prove to be historically important.

On the question: what is true and what false in materialism? it is possible to speak with more learning and more complication than in former days, but it may be doubted whether any substantially new arguments have been invented since Greek times. Nevertheless, it may be profitable to attempt a survey of the position as it appears in the light of modern science.

The theory of Democritus was intelligible and simple. The world consisted of hard round atoms of various sizes, all falling, but the heavier atoms falling faster, so that they would occasionally impinge upon the lighter atoms. If the impact was not exactly in the line of centres, there would be a resultant sideways motion, which accounts for the fact that bodies do not move only in one direction. This view, of course, had to be modified for purely physical reasons, but the modifications were not important until we come to Descartes with his plenum and his doctrine of vortices. This showed that atomism is not an essential part of materialistic physics. Newton's followers intro-

duced another modification, namely, action at a distance (which Newton himself still regarded as impossible). To this day the oscillation continues between atoms with action at a distance and a continuous medium (the æther) with continuous transmission of effects. Few physicists nowadays cling to either as a matter of principle; the only question is: which best explains observed phenomena? Both views have in common a belief in physical determinism, *i.e.* a belief that what happens in the world dealt with by physics happens according to laws such that, if we knew the whole state of the physical world during a finite time, however short, we could theoretically infer its state at any earlier or later time. This is the kernel of materialism from the standpoint of ethics, religion, sociology, etc., though not from the standpoint of metaphysics. If physical determinism is true—if, that is to say, everything that we commonly regard as the motion of matter is subject to laws of the above kind—then, although there may be a concurrent world of mind, all its manifestations in human and animal behaviour will be such as an ideally skilful physicist could calculate from purely physical data. Physics may still be unable to tell us anything about a man's thoughts, but it will be able to predict all that he will say and do. Under these circumstances, a man will be, for all practical purposes, an automaton, since his mental life can only be communicated to others or displayed in action by physical means. Even his thoughts can be inferred from physics, unless he is content never to give utterance to them.

This point of view resulted from Cartesianism, though most Cartesians attempted to escape from its consequences. Lamettrie, author of *L'homme machine*, justly claimed that he had derived his philosophy from Descartes. Descartes, who knew about the conservation of *vis viva*, but not

about the conservation of momentum, endeavoured to safeguard human freedom by maintaining that the will could alter the direction of motion of the animal spirits, though not the amount of their motion. He did not, however, extend this freedom to animals, which he regarded as automata. Nowadays no one would dream of drawing such a distinction between men and animals. And even his immediate followers had to abandon his position on this point, owing to the discovery of the conservation of momentum, which showed that the quantity of motion in each direction must be constant. From that day to our own, many philosophers have advocated the theory of two parallel series, one mental and one physical, each subject to its own laws, and neither influencing the other. This theory has less plausibility in our time than it had formerly; but apart from the question of its truth, it is worth while ro realise that it does not afford an escape from the more disagreeable consequences of materialism.

If there is parallelism between the physical and mental series, as this theory supposes, every physical law must have its psychological counterpart, and therefore psychology must be as rigidly deterministic as physics. There will be, so to speak, a dictionary, by which physical events can be translated into the concurrent mental events. Given this dictionary, the Laplacean calculator can, by physics alone, deduce the state of the material world at any given time, and discover from the dictionary what must be the corresponding state of the mental world. Clearly, the emancipation from physics which anti-materialists desire, is not to be achieved along these lines.

There is, however, no good reason to accept the theory of psycho-physical parallelism. The dualism of mind and matter is probably not ultimate, and the supposed impos-

sibility of interaction rests upon nothing better than scholastic dogmas. To common-sense it appears that our minds are affected by what we see and hear, and that, conversely, our bodies are affected by our volitions whenever we will to make any movement. There is no reason whatever to suppose that common-sense is mistaken in this view, although, of course, there is great need of analysis as to what really takes place when we perceive or will.

Lange advances, quite justly, as an argument against materialism, the fact that we only know about matter through its appearances to us, which, according to materialism itself, are profoundly affected by our own physical organisation. What we see depends not only upon what is there to be seen, but also upon the eye, the optic nerve, and the brain. But the eye, the optic nerve, and the brain are only known through being seen by the physiologist. In this way materialism is driven back to sensationalism. If it is to escape sensationalism, it must abandon the empirical scientific method, substituting for it the dogmatism of an *a priori* metaphysic, which professes to know what is behind appearances. Historically, we may regard materialism as a system of dogma set up to combat orthodox dogma. As a rule, the materialistic dogma has not been set up by men who loved dogma, but by men who felt that nothing less definite would enable them to fight the dogmas they disliked. They were in the position of men who raise armies to enforce peace. Accordingly we find that, as ancient orthodoxies disintegrate, materialism more and more gives way to scepticism. At the present day, the chief protagonists of materialism are certain men of science in America and certain politicians in Russia, because it is in those two countries that traditional theology is still powerful.

The two dogmas that constitute the essence of materialism are: First, the sole reality of matter; secondly, the reign of law. The belief that matter alone is real will not survive the sceptical arguments derived from the physiological mechanism of sensation. But it has received recently another blow, from the quarter whence it was least to be expected, namely, from physics. The theory of relativity, by merging time into space-time, has damaged the traditional notion of substance more than all the arguments of philosophers. Matter, for common-sense, is something which persists in time and moves in space. But for modern relativity-physics this view is no longer tenable. A piece of matter has become, not a persistent thing with varying states, but a system of inter-related events. The old solidity is gone, and with it the characteristics that, to the materialist, made matter seem more real than fleeting thoughts. Nothing is permanent, nothing endures; the prejudice that the real is the persistent must be abandoned.

The notion of substance has not been regarded by philosophers as metaphysically valid since the time of Hume and Kant, but it persisted in the practice of physics. Its defeat, within physics, by the abandonment of a single cosmic time affords a purely scientific argument against the older type of materialism, which utilised the belief that substance is what persists through time.

The reign of law raises more difficult and also more important questions. The outlook with which the phrase "reign of law" seems to belong most naturally is that of Newton, especially as developed by his disciples. Belief in the reign of law is often combined with strict theological orthodoxy, but in that case human volitions are excepted, at any rate in certain cases. The reign of law only becomes part of the materialistic outlook when it is believed to

have no exceptions, not even human volitions. It is in this form that we have to consider it. It will be necessary first to define the phrase, and then to inquire what ground there is for believing it applicable to the world.

The definition of the reign of law is by no means so easy as seems often to be supposed. The idea is derived from such instances as the law of gravitation in the solar system, where a simple formula enables us to predict the motions of the planets and their satellites. But this instance is deceptive in several respects. In the first place, there is no reason to suppose that the laws in other cases are equally simple. In the second place, it turns out that the Newtonian form of the law of gravitation is only approximate, and that the exact law is enormously more complicated. In the third place, the geography (if one may use such a term) of the solar system is amazingly schematic. To a first approximation, it may be regarded as consisting of a small number of mass-points, whose individual motions are easily observable. This point of view is not adequate for dealing with such matters as tides, but it suffices for the deduction of Kepler's laws from the law of gravitation, which was Newton's most spectacular achievement. It is obviously a very different matter to obtain laws applicable to individual electrons and protons, because of the greater geographical complexity involved. For these reasons, among others, it is rash to regard the Newtonian astronomy as typical of what is to be expected in physics.

The least that can be meant by the reign of law is this : given any phenomenon, there exists some formula of finite complexity such that, from a sufficient (finite) number of data at other times the phenomenon in question can be calculated. In practice, the " other times " will usually be earlier times, but this is not always the case—for example,

in speculations as to the geological history of the earth or the origin of the solar system. Theoretically, it should be irrelevant whether the " other times " are earlier or later than that of the phenomenon concerned.

In elucidation of the above definition, there are one or two observations to be made. The reason for saying that the formula must be of finite complexity is that otherwise nothing is asserted beyond a logical truism. By admitting formulæ of infinite complexity, any series of events whatever could be brought within the compass of a single law, and therefore we should assert nothing in asserting the reign of law. The reason for insisting that the number of data required must be finite is similar, but is reinforced by another, namely, that we cannot manipulate an infinite number of data, and could therefore never discover evidence either for or against a law which required them.

There is a further point which should be borne in mind. None of our observations are completely accurate ; there is always a margin of error. Consequently we can never prove that events obey *exactly* any law which is found to work within the margin of error, nor, conversely, need we trouble ourselves about inaccuracies which must remain below this margin. For example : it is always assumed in physics that continuous functions can be differentiated, although, as a matter of pure mathematics, this is known to be only sometimes the case. There is no harm in this from the physicist's standpoint, because, given any continuous function which cannot be differentiated, there will always be another which can be differentiated, and which differs from the first by less than the probable error in our observations. Approximations are all that we can achieve, and therefore all that we need attempt.

The question now arises : Is there any reason to believe

in the reign of law in the above sense ? In the world of pure physics there are a number of fundamental occurrences which cannot at present be reduced to law. No one knows why some atoms of a radio-active element disintegrate while others do not ; we know statistical averages, but what goes on in the individual atom is completely obscure. Again, the spectrum of an element is caused by electrons jumping from one possible orbit to another. We know a great deal about the possible orbits, and about what happens when a jump takes place, and about the proportion that choose one possible jump as compared to those that choose another. But we do not know what (if anything) decides the particular moment at which an electron jumps, or the particular jump that it sees fit to make when several are possible. Here, again, it is statistical averages that we know. It is therefore open to anybody to say that, while averages are subject to law, the actions of individual electrons have a certain range of caprice, within which there is no evidence for the reign of law. A man who maintained such a view dogmatically would be very rash, since to-morrow he might be refuted by some new discovery. But a man who merely maintains that, in the present state of physics, it is a possibility to be borne in mind, is displaying a proper scientific caution. Thus even within the pure physics of inorganic matter the reign of law cannot be asserted to be indubitably universal.

This doubt cannot but be increased when we pass on to biology and psychology. I do not mean that there is any positive evidence against the reign of law in this region ; I mean only that the evidence in its favour is less strong, because fewer laws are known, and prediction is as yet only possible within very narrow limits. The discovery of quanta in physics shows how rash it is to dogmatise

as to the further surprises which even an advanced science may have in store for us; and psychology is by no means an advanced science.

In the present condition of human knowledge, therefore, either to assert or to deny the universal reign of law is a mark of prejudice; the rational man will regard the question as open. All perennial controversies, such as that between determinists and believers in free will, spring from a conflict between opposing passions, both widespread, but one stronger in one man and the other in another. In this case, the conflict is between the passion for power and the passion for safety, because if the external world behaves according to law we can adapt ourselves to it. We desire the reign of law for the sake of safety, and freedom for the sake of power. Common-sense assumes that law governs inanimate nature and one's neighbours, while freedom is reserved for oneself. In this way both passions are gratified to the full. But philosophy demands some more subtle reconciliation, and is therefore never weary of inventing new ways of combining freedom with determination. The sceptic can merely observe this struggle with detachment, and he is fortunate if his detachment does not degenerate into cynicism.

It has always been customary, and since the time of Kant it has been thought even respectable, to invoke moral considerations in support of freedom. While, however, the sceptic has a good case as against the dogmatic believer in the universal reign of law, he is not likely to admit the opposite claim that a dogmatic disbelief in this principle is helpful to morals. If he is a sceptic worthy of the name, he will begin by saying that no one knows what beliefs are helpful to morals, or even whether beliefs have any noticeable influence on conduct. But if he is a student of

history, he will observe that, as a practical postulate, belief in natural law has borne good fruit by producing such knowledge as we possess, whereas its rejection has been associated with intolerance and obscurantism. He will say that, though possibly there may be phenomena not reducible to law, this is a mere speculative possibility, of which it is unnecessary to take account in the actual practice of science, since science can only advance by the discovery of laws, and where (if anywhere) there are no laws, there is also no possible science.

In our own time, the old battle of materialism persists chiefly in biology and physiology. Some men of science maintain that the phenomena of living organisms cannot be explained solely in terms of chemistry and physics ; others maintain that such explanation is always theoretically possible. Professor J. S. Haldane may be regarded, in this country, as the leading exponent of the former view ; in Germany it is associated with Driesch. One of the most effective champions of the mechanistic view was Jacques Loeb, who showed (*inter alia*) that a sea-urchin could have a pin for its father, and afterwards extended this result to animals much higher in the scale. The controversy may be expected to last for a long time, since, even if the mechanists are in the right, they are not likely soon to find explanations of all vital phenomena of the sort that their theory postulates. It will be a severe blow to the vitalists when protoplasm is manufactured in the laboratory, but they will probably take refuge in saying that their theories only apply to multi-cellular organisms. Later, they will confine vitalism to vertebrates, then to mammals, then to men, and last of all to white men—or perhaps it will be yellow men by that time. Ordinary scientific probability suggests, however, that the sphere of mechanistic explana-

tion in regard to vital phenomena is likely to be indefinitely extended by the progress of biological knowledge.

Psychology, which might have been expected to be more opposed to materialism than any other science, has, on the contrary, shown decided leanings in that direction. The behaviourist school maintains that psychology should only concern itself with what can be seen by external observation, and denies totally that introspection is an independent source of scientific knowledge. This view would make all the phenomena with which psychology is concerned physical phenomena, thereby conceding to materialism the utmost of its claims. Apart, however, from other difficulties, there is the difficulty already noted, that the data of physics are sensations, which are infected with the subjectivity of the observer. Physics seeks to discover material occurrences not dependent upon the physiological and psychical peculiarities of the observer. But its facts are only discovered by means of observers, and therefore only afford data for physics in so far as means exist of eliminating the observer's contribution to the phenomenon. This elimination is not an easy matter. It might be argued, on philosophical grounds, that it is impossible, and this is no doubt true if *complete* elimination is meant. But to a certain extent the problem can be treated scientifically, without raising metaphysical issues. It is then found that subjectivity is of three kinds, physical, physiological, and psychical. The first of these is satisfactorily dealt with by the theory of relativity: the method of tensors is its complete theoretical solution. The second and third are perhaps not really distinct; they can be dealt with in so far as one man's perceptions differ from another's, but it is difficult to see any method of eliminating subjective elements in which all men are alike.

There is one other respect in which psychology has been tending towards the point of view advocated by materialists. We used to hear much of such supposed faculties as "consciousness," "thought," and "reason." Many modern psychologists, following William James, are inclined to dismiss "consciousness" as a term destitute of any clear meaning. "Thought" and "reason," meanwhile, are found to be analogous to processes of learning among animals, which are ultimately reducible to the law of habit. All this, of course, is still controversial; but if it should prove correct, the psychological difficulties of materialism will be greatly diminished.

The conclusion of the above discussion would seem to be that, as a practical maxim of scientific method, materialism may be accepted if it means that the goal of every science is to be merged in physics. But it must be added that physics itself is not materialistic in the old sense, since it no longer assumes matter as permanent substance. And it must also be remembered that there is no good reason to suppose materialism metaphysically true: it is a point of view which has hitherto proved useful in research, and is likely to continue useful wherever new scientific laws are being discovered, but which may well not cover the whole field, and cannot be regarded as definitely true without a wholly unwarranted dogmatism.

B. R.

TRANSLATOR'S PREFACE.

THE "History of Materialism" was hailed, upon its original publication in Germany, as a work likely to excite considerable interest. In this country, Professor Huxley suggested, in the "Lay Sermons, Lectures, and Addresses" (published in 1870), that a translation of the book would be "a great service to philosophy in England." Soon afterwards there was published a second—thoroughly remodelled and re-written—edition of the work. And then, in the autumn of 1874, attention was again specially directed to it by Professor Tyndall's acknowledgment of his indebtedness "to the spirit and to the letter" of the work in his memorable address as President of the British Association at Belfast.

It was shortly after this that, seeing with regret that the book had so long awaited a translator, I ventured to apply to the author for his authority to undertake the task. The causes that have delayed its completion, since they are personal to myself, it would be an impertinence to trouble the reader with. The only one that is not so, is to be deplored on other grounds besides that of mere delay. The lamented death of the author, in November 1875, deprived me of the hoped-for opportunity of submitting my rendering to his friendly criticism.

The impatience expressed in many quarters has decided us to defer publication no longer; and accordingly the

reader has now before him the first instalment, to be speedily followed by two other volumes, which will complete the work. The division into three volumes instead of two—which in some respects might have been preferable—has been dictated by practical considerations.

The difficulties attending the translation of a philosophical German work into English are notorious. It would be absurd to suppose that I have always succeeded in meeting or eluding these difficulties; but I have endeavoured everywhere to translate as literally as was consistent with English idiom.

It may serve also to explain possible obscurities to remember that the book is written with continual reference to the problems and questions under discussion in Germany, and to the forms of speculation current there. It has been treated, indeed, by Von Hartmann as a polemic, 'eine durch geschichtliche Studien angeschwollene Tendenzschrift.'[1] And as an assertion of the Materialistic standpoint against the philosophy of mere 'Notions' ('intuitionless conceptions,' in Coleridge's phrase), and of the Kantian or Neo-Kantian standpoint against both, no doubt it is a polemic; but it is, at the same time, raised far above the level of ordinary controversial writing by its thoroughness, its comprehensiveness, and its impartiality.

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[1] See Eduard von Hartmann: Neukantianismus, Schopenhauerianismus und Hegelianismus in ihrer Stellung zu den philosophischen Aufgaben der Gegenwart. Berlin, 1877.

FREDERICK ALBERT LANGE:

BIOGRAPHICAL NOTES.

FREDERICK ALBERT LANGE was born at Wald near Solingen, in the district of Düsseldorf, on the 28th of September 1828. He was the son of the well-known Bible Commentator, Dr. J. P. Lange, now Professor in Bonn, who has also shown himself possessed of special capacities by rising from the position of a carter and labourer to be one of the leading Evangelical theologians of Europe.

The boy's early life was spent in Duisburg; but at the age of twelve, his father having received a call as Professor to Zürich, Switzerland became his second 'Fatherland,' and until the last he retained a strong love for the Republic and a keen interest in its politics. Already in his earlier years this interest must have been excited, for in that stirring period political passions extended even to the boys at school.

In 1848, having already attended the University of Zürich for two sessions, he followed the German custom of migrating from university to university, and went to Bonn to attend lectures on philology. His journey had to be made through a country shaken by the storms of that revolutionary period; and he wore for his protection while travelling a cockade of black gold and red. This he, with the patriot Arndt, was one of the last in Bonn to lay aside. All the struggles and activities of the time he followed with interest and enthusiasm. In a letter written in May 1849, he asks, "Should it not be clear to every reasonable man that civilised Europe must enter into one great

political community?" Unfortunately, twenty-eight years have done little to bring us nearer to this ideal. Another of his aspirations, expressed somewhat later, was destined to be realised. Germania was to wake up, like the hero-maiden in Schiller's poem, and cry, "Give me my helm!"

Having taken his degree of Doctor, he became an assistant-master in the 'Gymnasium,' or grammar-school, at Cologne; and in the following year he married.

But in 1855 he returned to Bonn as 'Privat-docent' of philosophy, lecturing on the History and Theory of Education, on the Schools of the Sixteenth Century, on Psychology, on Moral Statistics, and finally, in the summer of 1857, upon the History of Materialism. At the same time he was studying natural science, attending the lectures of Helmholtz upon physiology, and profiting by intimate intercourse with Frederick Ueberweg, the author of the well-known "System of Logic," and the "History of Philosophy."

In 1858, however, he was fain to take a mastership once more, this time at the Gymnasium at Duisburg; and there he continued until political considerations caused him to resign in 1861. He had now devoted himself to social and economic questions and to political agitation; and, amongst numerous other offices, filled the position of secretary to the Chamber of Commerce at Duisburg. In this post he gave evidence of a genius for finance which astonished and delighted the merchants and manufacturers of Duisburg. He was still, moreover, steadily working at his "History of Materialism," and was at the time delivering privately courses of lectures on the History of Modern Philosophy. From 1862 until 1866 he was one of the editors of the daily newspaper the "Rhein- und Ruhrzeitung," and maintained the principles of freedom and progress against the onslaught of reactionary government. His occupations were still further multiplied by his becoming a partner in a publishing and printing business, in which he undertook the direction of the printing establishment.

He was anxious for the spread of information amongst the people. Among the various works which he published at this period were his "Arbeiterfrage" (Labour Question), 1865, third edition 1874; and "John Stuart Mill's Ansichten über die Sociale Frage und die angebliche Umwälzung der Socialwissenschaft durch Carey," 1866 (Mill's views on the social question and the asserted revolution worked in social science by Carey). He founded also a newspaper to represent the interests of labour in the Rhenish and Westphalian provinces, but the attempt was continued for nine months only.

His own position was meanwhile becoming very difficult. His bold and independent treatment of the social question, which was then in the full tide of the agitation led by Ferdinand Lassalle, caused some coldness between Lange and his political friends. At the same time he was harassed by the press prosecutions which German Governments seem unable to avoid, and which the German people still continue to endure. Under these circumstances, he accepted overtures of partnership made to him by an old schoolfellow, who was proprietor of the well-known democratic newspaper, the "Landbote" of Winterthur, then, as now, a paper of great influence. To Winterthur, accordingly, he removed with his wife and family in November 1866; and he was speedily engaged to fill as many municipal and public offices as he had already held at Duisburg.

But the love of teaching, which had always been strong within him, led him to join the University of Zürich as a 'Privat-docent,' although he continued to live in Winterthur, until, in 1870, he was called to Zürich as Professor of Philosophy. For two years he worked zealously here, and declined a call to Königsberg. But much as he loved Switzerland, yet Germany was his true home, and a feeling of home-sickness (as he says) came over him when, in 1872, he was again invited by the Minister Falk to become Professor at Marburg. He accepted the invitation, and once more removed.

His work at Marburg was destined to be of short duration. The disease which ultimately proved fatal had some time before declared itself. He had undergone a serious operation, though with little prospect of advantage, at Tübingen, from which place he wrote to his wife:—

"Yesterday, in the Botanical Garden, I read 'Die Künstler' once more. I could not help applying a little to myself the splendid lines which have always been favourites with me—

> 'At peace with Fate, serenely goes his race—
> Here guides the Muse, and there supports the Grace;
> The stern Necessity, to others dim
> With Night and Terror, wears no frown for him:
> Calm and serene, he fronts the threatened dart,
> Invites the gentle bow, and bares the fearless heart.'[1]

"Can one express the Christian idea of resignation more beautifully or philosophically? And yet with such true poetry!"

For two years, however, he laboured with great energy and eminent success, lecturing before large classes upon various subjects connected with philosophy. These embraced logic and psychology, as a matter of course, but they were by no means limited to these. In one session, for instance, he lectured on the History of Modern Education, on the Theory of Voting, and on Schiller's Philosophical Poems.

It has been already mentioned that the "History of Materialism" had originally formed the subject of a course of lectures at the University of Bonn. By the side of such a list, indeed, the lecture-lists of the professors at our great English universities look very jejune and meagre. And it will be long, perhaps, before an Oxford professor lectures

[1] I have used the translation of Lord Lytton, Knebsworth edition of his "Translations from Schiller," p. 220. The original lines are—

> "Mit dem Geschick in hoher Einigkeit
> Gelassen hingestützt auf Grazien und Musen,
> Empfängt er das Geschoss, das ihn bedräut,
> Mit freundlich dargebotenem Busen,
> Vom sanften Bogen der Nothwendigkeit."

upon any subject so *real* as the 'Present Significance of Materialism.' But then, as we all know, our English universities are the proper homes of dead languages, and not of living ones; of extinct systems, and not of living, breathing thought. At Oxford, philosophy begins with Plato and ends with Aristotle; unless, perhaps, as some concession to two thousand years, we throw in a few aphorisms of Bacon, or a 'strayed scholastic' like Mr. Mill.

Meanwhile his disease continued its painful progress; but, undismayed by the approach of death, he busied himself, in addition to his professorial duties, with the preparation of the second edition of the "History of Materialism." The preface to the first volume of this substantially new work is dated June 1873; to the second, the 'end of January 1875.' After February of this same year, 1875, he was unable to leave the house again. Until three weeks before his death, and while his voice could scarcely rise above a whisper, he continued to work at his "Logical Studies," which have since been published. He died on the 21st of November.

With him, in the words of one of his old colleagues at Duisburg, there went to the grave "a light of science, a standard-bearer of freedom and progress, and a character of spotless purity."

Lange's restless activity and many-sidedness may be readily seen from the facts here put together. The distinguishing features of his mind and character are sufficiently illustrated in his great work, now presented to the reader. But two points that may be specially mentioned were, his intense belief in the 'reality of ideals;' and the way in which he connects the theories of science with ethical ideas. His heart beat for the lot of the masses, and he felt that the question of labour would be the great problem of the coming time, as it was the question that decided the fall of the ancient world. The core of this problem he believed to be 'the struggle against the struggle for existence,' which is identified with man's spiritual des-

tiny. And so we can understand the anxiety with which he looked forward to the great revolution which, in common with many thoughtful men, he believed to be impending upon modern society. But all that he could do to warn his fellow-men of the 'rocks' that were 'ahead,' and of the way in which they might be avoided, he did, not discouraged although he were little heeded. In his own words: "Never, indeed, will our efforts be wholly in vain. The truth, though too late, yet comes soon enough; for mankind will not die just yet. Fortunate natures hit the right moment; but never has the thoughtful observer the right to be silent, merely because he knows that for the present there are but few who listen to him."

AUTHOR'S PREFACE TO THE SECOND [AND LATER] EDITIONS.

THE changed form in which the "History of Materialism" appears in this second edition is partly a necessary consequence of the original plan of the book, but partly also a result of the reception it has met with.

As I incidentally explained in the first edition, my intention was rather to exercise an immediate influence; and I should have been quite content if my book had, in the course of five years, been again forgotten. Instead of this, however, and despite a number of very friendly reviews, it required almost five years for it to become thoroughly known, and it was never in greater demand than at the moment when it went out of print, and, as I felt, was already in many parts out of date. This was especially so with regard to the second portion of the work, which will receive at least as thorough a revision and remodelling as this present volume. The Books, the Persons, and the Special Questions around which turns the strife of opinions are partially changed. In particular, the rapid progress of the natural sciences required an entire renewal of the matter of some sections, even although the line of thought and the results might remain essentially unaltered.

The first edition, indeed, was the fruit of the labours of many years, but it was in point of form almost extemporised. Many defects incident to this mode of origin have been removed; but, on the other hand, some of the

merits of the first edition may have at the same time disappeared. I wished, on the one hand, to do justice to the higher standard which its readers, contrary to my original intention, have applied to the book; while, on the other, the original character of the work could not be wholly destroyed. I am very far then from claiming for the earlier portion, in its new form, the character of a normal historical monograph. I could not, and indeed I did not, wish to discard the predominant didactic and expository tone, that from the outset labours for and prepares the way for the final results of the Second Book, and sacrifices to this effort the placid evenness of a purely objective treatment. But as I everywhere appealed to the sources, and gave abundant vouchers in the notes, I hoped in this way to supply to a great extent the want of a proper monograph, without prejudice to the essential purpose of the book. This purpose consists now, as before, in the *exposition of principles*, and I am not over-eager to justify myself if some slight objection is therefore made to the appropriateness of my title. This has now its historical justification, at all events, and may remain. The two parts, however, form to me now, as before, an inseparable whole; but my right expires as soon as I lay down the pen, and I must be content if all my readers, even those who can use for their purposes only particular portions of the whole, will give due weight to the consideration of the difficulty of my task.

A. LANGE.

MARBURG, *June* 1873.

TABLE OF CONTENTS.

First Book.

HISTORY OF MATERIALISM UNTIL KANT.

First Section.—Materialism in Antiquity.

CHAPTER I.

THE EARLY ATOMISTS, ESPECIALLY DEMOKRITOS . Pp. 1–36

Materialism one of the earliest attempts at a philosophical theory of the world; conflict between philosophy and religion, 3. Evidence of this conflict in Ancient Greece, 5. Intercourse with the East; commerce; rise of philosophy, 8. Influence of mathematics and the study of nature, 9. The prevalence of deduction, 11. Strict carrying out of Materialism by Atomism, 13. Demokritos, his life and character, 15. His doctrines, 18. Eternity of matter, 19. Necessity, 20. The atoms and void space, 22. Formations of worlds, 24. Qualities of things, and of the atoms, 27. The soul, 28. Ethic, 31. Empedokles and the origin of adaptations, 32.

CHAPTER II.

THE SENSATIONALISM OF THE SOPHISTS, AND ARISTIPPOS'S ETHICAL MATERIALISM . . . . . Pp. 37–51

Sensationalism and Materialism, 37. The Sophists, especially Protagoras, 38. Aristippos, 44. Relation of theoretical to practical Materialism, 46. Dissolution of Hellenic civilisation under the influence of Materialism and Sensationalism, 48.

CHAPTER III.

THE REACTION AGAINST MATERIALISM AND SENSATIONALISM: SOKRATES, PLATO, ARISTOTLE . . Pp. 52–92

Undoubted retrogression and doubtful progress of the Athenian school as compared with Materialism, 52. The step from the particular to

the universal; preparation for it by the Sophists, 55. The causes of progress by antitheses, and of the combination of great advances with reactionary elements, 57. State of things in Athens, 58. Sokrates as a religious reformer, 60. Contents and tendency of his philosophy, 63. Plato, his intellectual tendency and development, 71. His conception of the universal, 75. The 'ideas' and the 'myth' in the service of speculation, 77. Aristotle; not an Empiricist, but a system-maker, 80. His teleology, 83. His doctrine of substance; name and essence, 85. Method, 88. Criticism of the Aristotelian philosophy, 90.

CHAPTER IV.

MATERIALISM IN GREECE AND ROME AFTER ARISTOTLE: EPIKUROS . . . . . Pp. 93–125

Intermittent influence of Greek Materialism, 93. Character of post-Aristotelian Materialism; ethical aim predominant, 95. The 'Materialism' of the Stoics, 96. Epikuros, his life and character, 98. His reverence of the gods, 100. Deliverance from superstition and the fear of death, 101. Doctrine of pleasure, 102. Physics, 103. Logic, and the theory of knowledge, 107. Epikuros as author, 111. Transition from the reign of philosophy to the predominance of the positive sciences; Alexandria, 112. Share of Materialism in the achievements of Greek scientific inquiry, 120.

CHAPTER V.

THE DIDACTIC POEM OF LUCRETIUS UPON *Nature* Pp. 126–158

Rome and Materialism, 126. Lucretius; his character and tendency, 129. Contents of the *First* Book; religion as source of all evil, 132. Nothing can come from nothing, and nothing can be annihilated, 133. Void space and atoms, 134. Praise of Empedokles; the infinity of the universe, 136. Idea of gravity, 137. Adaptations as persistent case among all possible combinations, 138. Contents of the *Second* Book; the atoms and their motion, 140. Origin of sensation; the infinite number of originating and perishing worlds, 143. Contents of the *Third* Book; the soul, 145. The vain fear of death, 147. Contents of the *Fourth* Book; the special anthropology, 149. Contents of the *Fifth* Book; cosmogony, 149. The method of possibilities in the explanation of nature, 150. Development of mankind; origin of speech, of the arts, of political communities, 152. Religion, 155. Contents of the *Sixth* Book; meteoric phenomena; diseases; Avernian spots, 155. Explanation of magnetic attraction, 157.

SECOND SECTION.—THE PERIOD OF TRANSITION.

CHAPTER I.

THE MONOTHEISTIC RELIGIONS IN THEIR RELATION TO MATERIALISM . . . . . Pp. 161–186

Decay of the ancient civilisation, 161. Influence of slavery; of the mixture of religions; of half-culture, 164. Infidelity and superstition; Materialism of life; luxuriance of vice and of religions, 165. Christianity, 169. Common features of the Monotheistic religions, 172. The Mosaic doctrine of creation, 174. Purely spiritual conception of God, 175. Strong opposition of Christianity to Materialism, 176. More favourable attitude of Mohammedanism; Averroism; services of the Arabians to natural science; Freethinking and toleration, 277. Influence of Monotheism on the aesthetic appreciation of nature, 184.

CHAPTER II.

SCHOLASTICISM, AND THE PREDOMINANCE OF THE ARISTOTELIAN NOTIONS OF MATTER AND FORM . . Pp. 187–214

The Aristotelian confusion of name and thing as basis of the Scholastic philosophy, 187. The Platonic conception of genus and species, 190. Fundamental ideas of the Aristotelian metaphysic, 192. Criticism of Aristotle's notion of Potentiality, 194. Criticism of the notion of Substance, 198. Matter, 200. Modern modifications of this notion, 201. Influence of the Aristotelian notions on the doctrine of the soul, 202. The question of Universals; Nominalists and Realists, 207. Influence of Averroism; of the Byzantine logic, 210. Nominalism as forerunner of Empiricism, 213.

CHAPTER III.

THE RETURN OF MATERIALISTIC THEORIES WITH THE REGENERATION OF THE SCIENCES . . . . . Pp. 215–249

Scholasticism as a bond of union in the civilisation of Europe, 215. The Renascence movement ends with the reform of philosophy, 216. The doctrine of twofold truth, 218. Averroism in Padua, 219. Petrus Pomponatius, 220. Nicolaus de Autricuria, 225. Laurentius Valla, 226. Melanchthon and various psychologists of the Reformation period, 227. Copernicus, 229. Giordano Bruno, 232. Bacon of Verulam, 236. Descartes, 241. The soul with Bacon and Descartes, 244. Influence of animal psychology, 245. Descartes' system, and his real opinions, 246.

Third Section.—Seventeenth Century Materialism.

CHAPTER I.

GASSENDI . . . . . Pp. 253–269

Gassendi as restorer of Epikureanism, 253. Choice of this system with reference to the needs of the time, especially in respect of scientific inquiry, 254. Compromise with theology, 257. Gassendi's youth; the 'Exercitationes Paradoxicae,' 258. His character, 259. Polemic against Descartes, 260. His doctrines, 263. His death; his importance for the reform of physics, and the philosophy of nature, 269.

CHAPTER II.

THOMAS HOBBES OF MALMESBURY . . Pp. 270–290

Hobbes's development, 270. Labours and experiences during his stay in France, 272. Definition of philosophy, 274. Method; connection with Descartes, not with Bacon; his recognition of great modern discoveries, 276. Attack upon theology, 279. Hobbes's political system, 280. Definition of religion, 283. Miracles, 284. Physical principles, 285. Relativity, 287. Theory of sensation, 288. The universe and the corporeality of God, 290.

CHAPTER III.

THE LATER WORKINGS OF MATERIALISM IN ENGLAND Pp. 291–330

Connection between the Materialism of the seventeenth and eighteenth centuries, 291. Circumstances in England favouring the spread of Materialism, 292. The union of scientific Materialism with religious faith; Boyle and Newton, 298. Boyle; his life and character, 300. His predilection for experiment, 302. Adheres to the mechanical theory of the universe, 303. Newton's life and character, 306. Considerations on the true nature of Newton's discovery; he shared the general belief in a physical cause of gravity, 308. The idea that this hypothetical agent determines also the motion of the heavenly bodies lay very near, and the way was already prepared for it, 309. The reference of the combined influence to the individual particles was a consequence of Atomism, 311. The supposition of an imponderable matter, producing gravitation by its impulse, was already prepared for, through Hobbes's relative treatment of the notion of atoms, 311. Newton declares most distinctly against the now prevailing notion of his doctrine, 312. But he separates the physical from the mathematical side of the question, 314. From the triumph of purely mathematical achievements arose a new physics, 315. Influence of the political activities of the age on the consequences of the systems, 317. John Locke, his life and intellectual development, 318. His "Essay concerning Human Understanding," 320. Other writings, 323. John Toland, his idea of a philosophical cultus, 324. The treatise on "Motion Essential to Matter," 326.

First Book—(*continued*).

HISTORY OF MATERIALISM UNTIL KANT.

Fourth Section.—The Eighteenth Century.

CHAPTER I.

The Influence of English Materialism in France and Germany . . . . . Pp. 3–48

England the classical land of Materialism, and of the union of religious faith and Materialism, 3. English Materialists in the eighteenth century: Hartley, 4; Priestley, 7. Scepticism in France: La Mothe le Vayer, 9; Pierre Bayle, 10. Beginning of intellectual intercourse between England and France, 11. Voltaire, 12. His activity in favour of the Newtonian philosophy, 13. His attitude towards Materialism, 17. Shaftesbury, 19. Diderot, 23; his relation to Materialism, 24. Transition to Robinet and his modification of Materialism, 29. Intellectual condition of Germany, 32. Influence of Descartes and Spinoza, 34. Influence of Englishmen, 36. The 'Correspondence on the Nature of the Soul,' 37. Various traces of Materialism, 47.

CHAPTER II.

De la Mettrie . . . . . Pp. 49–91

Rectification of the chronology, 49. Biographical, 54. The 'Natural History of the Soul,' 56. The hypothesis of Arnobius and Condillac's Statue, 62. 'L'Homme Machine,' 63. Lamettrie's character, 77. His theory of morals, 80. His death, 90.

CHAPTER III.

'THE SYSTEM OF NATURE' . . . . . Pp. 92–123

The leaders of the literary movement in France, and their relation to Materialism, 92. Cabanis and the materialistic physiology, 93. The System of Nature: general character, 93. Its author, Baron d'Holbach, 94. Holbach's other writings, 95. His ethic, 96. Contents of the work; the anthropological portion and the general foundations of the study of nature, 97. Necessity in the moral world; relations to the French Revolution, 102. 'Order and disorder are not in Nature;' Voltaire's polemic against this principle, 104. Consequences of Materialism through the Association of Ideas, 106. Results for the conception of the æsthetic, 107. Diderot's conception of the Beautiful, 108. The justification of ethical and æsthetic ideas, 109. Holbach's attack upon the Immateriality of the Soul, 111. Remark as to Berkeley, 112. Attempt at a physiological basis for morals, 113. Political passages, 114. The second part of the work: attack upon the idea of God, 115. Religion and morality, 119. General possibility of Atheism, 121. Conclusion of the work, 122.

CHAPTER IV.

THE REACTION AGAINST MATERIALISM IN GERMANY Pp. 124–150

The philosophy of Leibnitz as an attempt to surmount Materialism, 124. Popular effect and true sense of philosophical principles; his doctrine of the Immateriality of the Soul, 127. Optimism and its relation to the mechanical theory, 131. Doctrine of Innate Ideas, 132. Wolff's philosophy and the doctrine of the Simplicity of the Soul, 133. Animal Psychology, 134. Writings against Materialism, 135. The insufficiency of the School-philosophy as against Materialism, 141. Materialism displaced by the ideal effort of the eighteenth century, 142. Reform of the Schools from the beginning of the century, 143. The search for the Ideal, 146. Influence of Spinozism, 147. Goethe's Spinozism and his judgment of the System of Nature, 148.

Second Book.

HISTORY OF MATERIALISM SINCE KANT.

First Section.—Modern Philosophy.

CHAPTER I.

KANT AND MATERIALISM . . . . . Pp. 153–234

The Return of German philosophy to Kant. Abiding significance of Criticism. Reversal of the metaphysical standpoint, 153. Movement and Sensation: the world as phenomenon, 157. Experience as product of Organisation. Kant in his relation to Plato and Epikuros, 158. Kant in opposition to Subjectivism and to Scepticism. Impulse from Hume: his standpoint, 159. Kant and Experience, 163. Analysis of Experience. Synthetic judgments *a priori*, 164. The discovery of *a priori* elements, 190. Sensibility and Understanding, 194. Space and Time as forms of Sensibility. Whether Sensation cannot measure itself by Sensation. Psychophysics, 198. Apriority of Space and Time equally tenable, 199. Attitude of Materialism towards the doctrine of Space and Time, 203. The Categories, 204. Hume's attack upon the notion of Causality, 205. Deduction of the categories, 208. Errors of the deductive process. Sound Common Sense. The basis of notions *a priori*, 209. Various conceptions of the notion of Causality, 211. Attitude of Empiricists and Materialists to the notion of Causality, 213. The thing-in-itself, 216. The deduction of the Categories and the origin of ideas, 219. Free will and the moral law, 227. The intellectual world as ideal, 232.

CHAPTER II.

PHILOSOPHICAL MATERIALISM SINCE KANT Pp. 235–294

The native lands of modern philosophy turn to practical life, while metaphysic remains to Germany. The course of intellectual development in Germany, 235. Causes of the revival of Materialism; influence of the natural sciences; Cabanis and the Somatic method in physiology, 240. Influence of habituation to conflicts of opinion and freedom of thought, 244. The philosophy of nature, 245. Tendency to Realism since 1830, 245. Feuerbach, 246. Max Stirner, 256. Decay of poetry; development of commercial activity and natural science, 257. Theological criticism and 'Young Ger-

many'; increasing excitement until 1848, 260. The reaction and material interests; renewed impulse towards Natural Science, 263. Beginning of the Materialistic controversy, 263. Büchner and philosophy, 265. Büchner; impulse from Moleschott; obscurities and defects of his Materialism, 270. Moleschott; influence of Hegel and Feuerbach; Moleschott's unmaterialistic theory of Knowledge, 275. Possibility of Materialism according to Kant. The categorical imperative: Content thyself with the given world, 282. Czolbe, 284.

Second Section.—The Natural Sciences.

CHAPTER I.

Materialism and Exact Research . . Pp. 297–350

Materialists and Scientific Specialists; Dilettanteism and Scholasticism in natural science and philosophy, 297. Scientific and philosophical modes of thought, 302. The Limits of Natural Knowledge: Du Bois-Reymond, 308. Misunderstandings of Materialists and theologians, 313. Correction of the consequences of Du Bois-Reymond's hypotheses, 319. The limits of natural knowledge are the limits of knowledge in general, 321. The mechanical cosmology cannot discover the inmost nature of things, 323. Materialism makes theory into reality and the immediately given into appearance, 324. Sensation a more fundamental fact than the mobility of matter, 326. Even the hypothesis of a sentient matter does not remove all difficulties. The unknown *tertium quid*, 328. Unfair reproaches against Materialism, 329. Overcoming of Materialism by philosophical and historical culture, 332. Value of theories, 336. Materialism and Idealism in scientific research, 337.

CHAPTER II.

Force and Matter . . . . Pp. 351–397

History of the atomic notion. Boyle, 351. Influence of Newton's law of gravitation, and of Hobbes' relativistic modification of the atomic notion, 353. Dalton, 354. Richter, 358. Gay-Lussac, 359. Avogadro's molecular theory. Berzelius. Dulong and Petit, 359. Mitscherlich and Isomorphism. The theory of Types, 361. Doubts as to theories; stricter distinction between Fact and Hypothesis, 362. Mathematicians and Physicists. Theory of extensionless atoms, 363. Fechner, 365. Objections to the extensionless atoms; W. Weber's idea of an unextended mass, 369. Influence of modern chemical theories, and of the mechanical theory of heat upon the notion of an atom, 371. Attempt of the Materialists to subordinate force to matter; criticism of this attempt, 377. The molecules become ever better known, the atoms ever more uncertain, 382. The law of the persistence of force, 389. Influence of this law on the notion of matter. Relativistic definitions of Thing, Force, and Matter, 391. Fechner's and Zöllner's views. The problem of force and matter is a problem of the theory of knowledge, 394.

Second Book—(*continued*).

HISTORY OF MATERIALISM SINCE KANT.

Second Section continued.—The Natural Sciences.

CHAPTER III.

The Scientific Cosmogony, ... Pp. 3–25

Modern Cosmogony connects itself with Newton; the condensation-theory, 3–5. The geological stability-theory, 5–6. Long periods of time, 6. Conclusions as to the necessary destruction of the solar system, and of all life in the universe, 7–13. The origin of organisms, 13 ff. The hypothesis of spontaneous generation, 14–21. The transmission-theory according to Thomson and Helmholtz; Zöllner's opposition, 21–24. Fechner's views, 24–25.

CHAPTER IV.

Darwinism and Teleology, ... Pp. 26–80

Interest in Darwinism has greatly increased; the questions have been specialized, but the main features have remained unaltered, 26–27. The superstition of species, 27. Necessity of experiment, 28. Teleology, 32–36. Individual, 36–41. The network of classification of the animal world is inapplicable to the lower forms, 42. Stability of organic forms as necessary consequence of the struggle for existence; the equilibrium of forms, 43–47. Mimicry, 48–51. Correlation of growth; morphological kinds; the law of development, 51–59. Differences between apparently like primitive forms, 59–62. Monophyletic and Polyphyletic descent, 62–66. False and true Teleology, 66–70. Von Hartmann's Teleology as a model of false Teleology based upon a gross misunderstanding of the calculus of probabilities, 71–79. The value of the 'Philosophy of the Unconscious' does not depend upon this, 79–80.

Third Section.—The Natural Sciences continued. Man and the Soul.

CHAPTER I.

The Relation of Man to the Animal World, . Pp. 83–110

Growing interest in Anthropological as compared with Cosmical questions; progress of the Anthropological Sciences, 83–85. The application of the theory of descent to man obvious, 85. Cuvier's dicta, 87–88. Discovery of diluvial human remains: their age, 89–93. Traces of ancient civilizations, 94–101. Influence of the sense of beauty, 101. The upright position; origin of speech, 102. The course of the development of civilization at first slow, then more and more rapid, 104. The question of unity of species, 105–107. Relation of Man to the Ape, 107–110.

CHAPTER II.

Brain and Soul, ... Pp. 111–161

The difficulties of the subject have become more obvious with the progress of the sciences. Injurious reaction of scholastic psychology, 111–112. Phrenology, 113–125. Reflex movements as the basis of psychical activity. Pflüger's experiments, 125–127. Various misunderstandings and erroneous interpretations of physiological experiments, 127–133. The brain does not produce any psychological abstractum, 133. Erroneous theories of Carus and Huschke, 134–137. Scholastic ideas must be discarded, 137–138. Stubbornness of the prejudice as to the localizations of mental functions, 138. Meynert's brain researches, 139–142. Psychological importance of the motor paths, 142–144. Identity of the excitation in all nerves, 144. Experiments of Hitzig, Nothnagel, and Ferrier; their meaning, 145–153. Wundt's remarks on the elementary phenomena of the psychical functions, 153. Carrying out of the laws of the conservation of energy by the cerebral functions, 154–159. Intellectual value of the content of sensation, 159.

CHAPTER III.

Scientific Psychology, ... Pp. 162–201

Errors in the attempts at a Scientific and Mathematical Psychology: Herbart and his School, 162–167. Necessity of a criticism of Psychology, 167. Hypotheses as to the 'Nature of the Soul:' a psychology without a Soul, 168–169. Criticism of self-observation and of observation by means of the 'internal sense,' 169–174. Scientific Method and Speculation, 175–178. Animal psychology, 178, 179. Ethnopsychology; ethnographical accounts of travel, 180–183. Darwin's influence, 183–184. Somatic method: application of experiment, 184–186. Empirical psychology in England: Mill, Spencer, Bain, 186–193. Moral statistics, 194–201.

CHAPTER IV.

THE PHYSIOLOGY OF THE SENSE-ORGANS AND THE WORLD AS REPRESENTATION, ... Pp. 202–230

The physiology of the sense-organs shows that we do not perceive external objects but produce the appearance of such objects, 202–205. The projection of objects outward and erect vision according to Müller and Ueberweg, 206–209. Further exposition and criticism of Ueberweg's theory, 209–215. Helmholtz on the nature of the sense-perceptions, 215–216. The sense-organs as an abstraction-apparatus, 217–218. Analogy with abstraction in thinking, 218. Psychological explanation of phenomena does not exclude the existence of mechanical cause, 218–219. The sense-world a product of our organization, 219. Unconscious inferences, 220–222. The assumption of a mechanism for all psychical functions not necessarily Materialism, because the mechanism itself is only representation, 223–224. Ueberweg's attempt to demonstrate the transcendental reality of space, 224–225; results, 225–229. Rokitansky's contention that the atomistic theory supports an idealistic view of things, 229–230.

FOURTH SECTION.—ETHICAL MATERIALISM AND RELIGION.

CHAPTER I.

POLITICAL ECONOMY AND DOGMATIC EGOISM, Pp. 233–268

Origin of the theoretical assumption of a purely egoistic society, 233–235. Right and limits of abstraction; confusion of abstraction and reality, 235–237. The accumulation of capital and the law of the increase of wants, 237–241. Supposed utility of Egoism, 242–244. Origin of Egoism and Sympathy, 244–246. Moral progress wrongly denied by Buckle, 246–247. Egoism as a moral principle and the harmony of interests, 247–253. Examination of the doctrine of the harmony of interests, 253–259. Causes of inequality and rise of the proletariat, 259–268.

CHAPTER II.

CHRISTIANITY AND ENLIGHTENMENT, . . . Pp. 269–291

The ideas of Christianity as remedies for social evils: their apparent inefficacy according to Mill, 269–270. Mediate and gradual influence; connexion of Christianity and social reform, 270–273. Moral influences of belief partly favourable, partly unfavourable, 273–276. Importance of form in Morality and Religion, 276–280. Pretension of Religion to truth, 280–282. Impossibility of a Religion of Reason without Imagination, 282–287. Pastor Lang and his argument against this view, 287–291.

CHAPTER III.

THEORETICAL MATERIALISM IN ITS RELATION TO ETHICAL MATERIALISM AND TO RELIGION, . . . Pp. 292–334

Character of the usual attacks upon Religion, 292–293. Predominance of the rational principle, 294–295. Plans for a new religion: Comte's new hierarchy, 295–297. Scientific knowledge cannot be handled ecclesiastically but only secularly, 297–298. It is not moral teaching that makes religion but the tragical stirring of the soul, 299. Our cultus of humanity does not require religious forms, 300. Materialism would be most consistent in rejecting Religion altogether, 301. Examination of the connexion between Ethical and Theoretical Materialism, 302–305. Development of Materialism with Ueberweg, 305. His earlier standpoint, 306. Materialistic basis of his Psychology, 306–309. His Teleology, 310. Consciousness of its weakness, 311. The existence of God, 312. Transition to Materialism: vouchers for it from his letters to Crolbe and to the Author, 313–316. Doubt as to Ueberweg's asserted Atheism, 316. Ethical consequences of his philosophy: relation to Christianity, 316–323 David Friedrich Strauss: his last and definitive philosophy Materialistic, 323–325. His Materialism correct and thought out, 325–327. Superficial treatment of social and political questions; Conservative tendency, 327–328. Rejection of the specific features of Christian ethics; Optimism; condemnation of the worship of the Free Congregations, 328–330. Neglect of the people and its needs, 331. Leaning of the propertied classes to Materialism; the Socialists and the danger of the ruin of our civilisation, 332–334.

CHAPTER IV.

THE STANDPOINT OF THE IDEAL, ... Pp. 335–362

Materialism as the philosophy of reality: nature of reality, 335–337. The functions of Synthesis in speculation and in religion; origin of Optimism and Pessimism, 337–338. Value and import of reality, 339–340. Its limits: the step to the Ideal. Pessimism of reflexion and optimism of the Ideal, 341–342. Reality needs to be supplemented by an ideal world; Schiller's philosophical poems: the future of religion and its inner essence, 342–348. The philosophy of religion, especially Fichte; grouping of men by the form of their inner life, 349–352. Fortunes of religion in critical times; possibility of new forms of religion; conditions of its existence, 353–356. Conditions of peace between opposed standpoints, 356–359. The Materialistic controversy as a serious sign of the time; the social question and the impending conflicts; possibility of their mitigation, 359–362.

PREFACE TO THE SECOND BOOK [AS POSTSCRIPT], . Pp. 363–365

INDEX . . . . . Pp. 367–376

First Book.

HISTORY OF MATERIALISM UNTIL KANT.

FIRST SECTION.

MATERIALISM IN ANTIQUITY.

CHAPTER I.

THE EARLY ATOMISTS—ESPECIALLY DEMOKRITOS.

MATERIALISM is as old as philosophy, but not older. The physical conception of nature which dominates the earliest periods of the history of thought remains ever entangled in the contradictions of Dualism and the fantasies of personification. The first attempts to escape from these contradictions, to conceive the world as a unity, and to rise above the vulgar errors of the senses, lead directly into the sphere of philosophy, and amongst these first attempts Materialism has its place.[1]

With the beginning, however, of consecutive thinking there arises also a struggle against the traditional assumptions of religion. Religion has its roots in the earliest

[1] My first sentence, which has been sometimes misunderstood, is directed, on the one hand, against the despisers of Materialism, who find in this view of the universe an absolute contradiction of all philosophical thought, and deny it the possession of any scientific importance; and, on the other hand, against those Materialists who, in their turn, despise all philosophy, and imagine that their views are in no way a product of philosophical speculation, but are a pure result of experience, of sound common sense, and of the physical sciences. It might, perhaps, have been more simply maintained that the first attempt at a philosophy at all amongst the Ionic physicists was Materialism; but the consideration of a long period of development, reaching from the first hesitating and imperfect systems down to the rigidly consistent and calmly reasoned Materialism of Demokritos, shows us that Materialism can only be numbered "amongst the earliest

crudely-inconsistent notions, which are ever being created afresh in indestructible strength by the ignorant masses. An immanent revelation, vaguely felt rather than clearly realised, lends it a deep content, while the rich embellishments of mythology and the venerable antiquity of tradition endear it to the people. The cosmogonies of the East and of Greek antiquity present us with ideas that are as little spiritual as they are material. They do not try to explain the world by means of a single principle, but offer us anthropomorphic divinities, primal beings half sensuous half spiritual, a chaotic reign of matter and forces in manifold changeful struggle and activity. In the presence of this tissue of imaginative ideas awakening thought calls for order and unity, and hence every system of philosophy entered upon an inevitable struggle with the theology of its time, which was conducted, according to circumstances, with more or less open animosity.

It is a mistake to overlook the presence, and indeed the momentous influence, of this struggle in Greek antiquity, although it is easy to see the origin of the mistake. If the generations of a distant future had to judge of the whole

attempts." Indeed, unless we identify it with Hylozoism and Pantheism, Materialism only becomes a complete system when matter is *conceived as purely material*—that is, when its constituent particles are not a sort of *thinking matter*, but physical bodies, which are moved in obedience to merely physical principles, and being in themselves without sensations, produce sensation and thought by particular forms of their combinations. And thorough-going Materialism seems always necessarily to be Atomism, since it is scarcely possible to explain whatever happens out of matter clearly and without any mixture of supersensuous qualities and forces, unless we resolve matter into small atoms and empty space for them to move in. The distinction, in fact, between the soul-atoms and the warm air of Diogenes of Apollonia, despite all their superficial similarity, is of quite fundamental importance. The latter is an absolute Reason-stuff (*Vernunftstoff*); it is capable in itself of sensation, and its movements, such as they are, are due to its rationality. Demokritos' soul-atoms move, like all other atoms, according to purely mechanical principles, and produce the phenomenon of thinking beings only in a special combination mechanically brought about. And so, again, the "animated magnet" of Thales harmonises exactly with the expression *πάντα πλήρη θεῶν*, and yet is at bottom clearly to be distinguished from the way in which the Atomists attempt to explain the attraction of iron by the magnet.

thought of our own time solely from the fragments of a Goethe and a Schelling, a Herder or a Lessing, they would scarcely observe the deep gulfs, the sharp distinctions of opposite tendencies that mark our age. It is characteristic of the greatest men of every epoch that they have reconciled within themselves the antagonisms of their time. So is it with Plato and Sophokles in antiquity; and the greatest man often exhibits in his works the slightest traces of the struggles which stirred the multitude in his day, and which he also, in some shape or other, must have passed through.

The mythology which meets us in the serene and easy dress due to the Greek and Roman poets was neither the religion of the common people nor that of the scientifically educated, but a neutral territory on which both parties could meet.

The people had far less belief in the whole poetically-peopled Olympus than in the individual town or country deities whose statues were honoured in the temple with special reverence. Not the lovely creations of famed artists enthralled the suppliant crowd, but the old-fashioned, rough-hewn, yet honoured figures consecrated by tradition. Amongst the Greeks, moreover, there was an obstinate and fanatical orthodoxy, which rested as well on the interests of a haughty priesthood as on the belief of a crowd in need of help.[2]

This might have been wholly forgotten if Sokrates had not had to drink the cup of poison; but Aristotle also fled

[2] In view of the completely opposite account of Zeller (Phil. d. Griechen, i. S. 44 ff. 3 Aufl.), it may be proper to remark, that we may assent to the proposition, "The Greeks had no hierarchy, and no infallible system of dogmas," without needing to modify the representation in the text. "The Greeks," we must remember, had no political unity in which these could have been developed. Their system of faiths exhibited an even greater variety of development than the constitutions of the individual cities and countries. It was natural that the thoroughly local character of their cultus, in conjunction with an increasing friendly intercourse, should lead to a toleration and liberality which was inconceivable amongst highly credulous and at the same time centralised peoples. And yet, of all the Greek efforts towards unity, those of a hierarchic and theocratical tendency

from Athens that the city might not a second time commit sacrilege against philosophy. Protagoras also had to flee, and his work upon the gods was publicly burnt. Anaxagoras was arrested, and obliged to flee. Theodorus, "the

were perhaps the most important; and we may certainly consider, for example, the position of the priesthood of Delphi as no insignificant exception to the rule that the priestly office conferred "incomparably more veneration than power." (Comp. Curtius, Griech. Gesch., i. p. 451; Hist. of Gr., E. T., ii. 12, in connection with the elucidations of Gerhard, Stephani, Welcker, and others as to the share of the theologians of Delphi in the extension of Bacchus-worship and the mysteries.) If there was in Greece no priestly caste, and no exclusive priestly order, there were at least priestly families, whose hereditary rights were preserved with the most inviolable legitimism, and which belonged, as a rule, to the highest aristocracy, and were able to maintain their position for centuries. How great was the importance of the Eleusinian mysteries at Athens, and how closely were these connected with the families of the Eumolpidæ, the Kerykes, the Phyllidæ, and so on! (Comp. Hermann, Gottesd. Alterth., S. 31, A. 21; Schömann, Griech. Alterth., ii. S. 340, u. f. 2 Aufl.) As to the *political* influence of these families, the fall of Alkibiades affords the clearest elucidation, although in trials which bring into play high-church and aristocratic influences in connection with the religious fervour of the masses, the individual threads of the network are apt to escape observation. As to orthodoxy, this must indeed not be taken to imply a scholastic and organised system of doctrines. Such a system might perhaps have arisen if the Theocrasy of the Delphic theologians and of the mysteries had not come *too late* to prevent the spread of philosophic rationalism amongst the aristocratic and educated classes. And so men remained content with the mystery-worships, which allowed every man on all other points to think as he pleased. But all the more inviolable remained the general belief in the sanctity and importance of these particular gods, these forms of worship, these particular sacred words and usages, so that here nothing was left to the individual, and all doubt, all attempts at unauthorised changes, all casual discussion, remained forbidden. There was, however, without doubt, even with regard to the mythical traditions, a great difference between the freedom of the poets and the strictness of the local priestly tradition, which was closely connected with the cultus. A people which met with different gods in every city, possessed of different attributes, as well as a different genealogy and mythology, without having its belief in its own sacred traditions shaken thereby, must with proportionate ease have permitted its poets to deal at their own pleasure with the common mythical material of the national literature; and yet, if liberties thus taken appeared in the least to contain a direct or indirect attack upon the traditions of the local divinities, the poet, no less than the philosopher, ran into danger. The series of philosophers named in the text as having been persecuted in Athens alone might easily be enlarged; for example, by Stilpo and Theophrastos (Meier u. Schömann, Att. Prozess, S. 303, u. f.). There might be added poets like Diagoras of Melos, on whose head a price was set; Aeschylos, who incurred the risk of his life for an alleged violation of the mysteries, and was only acquitted by the Areopagus

atheist," and probably also Diogenes of Apollonia, were prosecuted as deniers of the gods. And all this happened in humane and enlightened Athens.

From the standpoint of the multitude, every philosopher, even the most ideal, might be prosecuted as a denier of the gods; for no one of them pictured the gods to himself as the priestly tradition prescribed.

If we cast a glance to the shores of Asia Minor in the

in consideration of his great services; Euripides, who was threatened with an indictment for atheism, and others. How closely tolerance and intolerance bordered upon each other in the minds of the Athenians is best seen in a passage from the speech against Andokides (which, according to Blass, Att. Beredsamkeit, S. 566 ff., is not really by Lysias, although it is a genuine speech in those proceedings). There it is urged that Diagoras of Melos had only outraged (as a foreigner) the religion of strangers, but Andokides had insulted that of his own city; and we must, of course, be more angry with our fellow-countrymen than with strangers, because the latter have not transgressed against their own gods. This subjective excuse must have issued in an objective acquittal, unless the sacrilege was especially directed against the Athenian, and not against a foreign religion. From the same speech we see further, that the family of the Eumolpidæ was authorised, under certain circumstances, to pass judgment against religious offenders according to a secret code whose author was entirely unknown. (That this happened under the presidency of the King Archon—comp. Meier u. Schömann, S. 117, u. f.—is for our purpose unimportant.) That the thoroughly conservative Aristophanes could make a jest of the gods, and even direct the bitterest mockery against the growing superstition, rests upon entirely different grounds; and that Epikuros was never persecuted is of course explained simply by his decided participation in all the external religious ceremonies. The political tendency of many of these accusations establishes rather than disproves their foundation in religious fanaticism. If the reproach of ἀσέβεια was one of the most effectual means of overthrowing even popular statesmen, not the letter of the law only, but the passionate religious zeal of the masses must obviously have existed; and accordingly we must regard as inadequate the view of the relation of church and state in Schömann, Griech. Alterth., i. S. 117, 3 Aufl., as well as many of the points in Zeller's treatment of the question above referred to. And that the persecutions were not always in connection with ceremonies, but often had direct reference to doctrine and belief, appears to be quite clearly proved by the majority of the accusations against the philosophers. But if we reflect upon the by no means small number of cases of which we hear in a single city and in a comparatively short space of time, and upon the extreme peril which they involved, it will scarcely appear right to say that philosophy was attacked "in a few only of its representatives." We have still rather seriously to inquire, as again in the modern philosophy of the seventeenth, eighteenth (and nineteenth?) centuries, How far the influence of conscious or unconscious accommodation to popular beliefs beneath the pressure of threatening persecution has left its mark upon the systems themselves?

centuries that immediately precede the brilliant period of Hellenic intellectual life, the colonies of the Ionians, with their numerous important cities, are distinguished for wealth and material prosperity, as well as for artistic sensibility and refinement of life. Trade and political alliances, and the increasing eagerness for knowledge, led the inhabitants of Miletos and Ephesos to take long journeys, brought them into manifold intercourse with foreign feelings and opinions, and furthered the elevation of a free-thinking aristocracy above the standpoint of the narrower masses. A similar early prosperity was enjoyed by the Doric colonies of Sicily and Magna Graecia. Under these circumstances, we may safely assume that, long before the appearance of the philosophers, a freer and more enlightened conception of the universe had spread amongst the higher ranks of society.

It was in these circles of men, wealthy, distinguished, with a wide experience gained from travel, that philosophy arose. Thales, Anaximander, Herakleitos, Empedokles took a prominent position amongst their fellow-citizens, and it is not to be wondered at that no one thought of bringing them to account for their opinions. This ordeal, it is true, they had to undergo, though much later; for in the last century the question of the atheism of Thales was eagerly handled in special monographs.[3] If we compare, in this

[3] Comp. Zeller, i. S. 176, Anm. 2, 3 Aufl., and the works quoted in Marbach, Gesch. d. Phil., S. 53, which, and that by no mere coincidence, appeared at the period of the Materialist controversy of the last century. With regard to the statement of Zeller, who seems to me to rate Thales too low, I may observe, that the passage in Cicero, De Nat. Deorum, i. x. 23, formerly employed to prove the theism of Thales, with Cicero's characteristic shallowness, by the expression "fingere ex," indicates a Demiurgus standing *outside* the world-stuff, while God, as "world-reason," especially in the Stoical sense, refers merely to an immanent, not anthropomorphic, and therefore also not a personal God. Even though the Stoic tradition may rest upon a mere interpretation of an older tradition in the sense of their own system, yet it does not follow from this that this interpretation (apart from the genuineness of the *words*) is also false. Judging from the connection, the probably genuine expression that all things are full of gods may very likely be the origin of the notion—an expression which even Aristotle (De An., i. 5, 17) obviously

respect, the Ionic philosophers of the sixth century with the Athenians of the fifth and fourth, we shall at once be reminded of the contrast between the English sceptical movement of the seventeenth and the French of the eighteenth century. In the one case, nobody thought of drawing the people into the war of opinions;[4] in the other, the movement was a weapon with which fanaticism was to be assaulted.

Hand in hand with this intellectual movement proceeded among the Ionians the study of mathematics and natural science. Thales, Anaximander, and Anaximenes busied themselves with special problems of astronomy, as well as with the explanation of the universe; and Pythagoras transplanted the taste for mathematical and physical inquiry to the westward colonies of the Doric stock. The fact that, in the eastern portion of the Greek world, where the intercourse with Egypt, Phœnicia, Persia, was most active, the scientific movement began, speaks more decidedly for the influence of the East upon Greek culture than the fabulous traditions of the travels and studies of Greek philosophers.[5] The idea of an absolute originality

interprets *symbolically;* so that the doubt indicated by *ἴσως* refers (and rightly) to his own interpretation only, which is, in fact, much more perverse and improbable than that of the Stoics. To refute (Zeller, i. 173) the view of the latter by Aristotle (Met., i. 3) is unsafe, because Aristotle is undoubtedly there bringing out the element in Anaxagoras which was related to his own philosophy, that is, the *separation* of the world-forming Reason, as of the cause of Becoming, from the matter upon which it works. That he is not content with this very element in Anaxagoras, as is shown by the very next chapter, because the transcendental principle appears only occasionally, and is not consistently carried out, is a necessary consequence of the transitional and by no means wholly consistent position of Anaxagoras. So the way in which he speaks of his doubtful merit, as also the severe censure of his inconsistency, are in Aristotle only the continuation of the fanatical zeal with which the Platonic Sokrates, in the *Phaedo*, c. 46, handles the same point.

[4] Comp. Buckle, History of Civilization, i. 497 sqq.

[5] Compare the lengthy refutation of the views as to the rise of Greek philosophy from Oriental speculation in Zeller, i. S. 20 ff., 3 Aufl., and the concise but very careful discussion of the same question in Ueberweg, i., 4 Aufl., S. 32, E. T. 31. The criticism of Zeller and others has for ever displaced the cruder views that the East taught philosophy to the Greeks; on the other hand, the remarks of Zeller (S. 23 ff.) as to the influence of the

of Hellenic culture may be justified if by this we mean originality of form, and argue the hidden character of its roots from the perfection of the flower. It becomes, however, delusive if we insist upon the negative results of the criticism of special traditions, and reject those connections and influences which, although the usual sources of history fail us, are obviously suggested by a view of the circumstances. Political relations, and, above all, commerce, must necessarily have caused knowledge, sentiments, and ideas to flow in many ways from people to people; and if Schiller's saying, "Euch ihr Götter gehöret der Kaufmann" ("To you, O gods, belongs the merchant"), is genuinely human, and therefore valid for all time, many an intercommunication will have been later connected by mythology with some famous names, whose true bearers have for ever been lost to memory.

Certain it is that the East, in the sphere of astronomy and the measurement of time, was ahead of the Greeks. The people of the East, too, possessed mathematical know-

common Indo-Germanic descent, and the continual influence of neighbourhood, may well gain an increased significance with the progress of Oriental studies. Especially with regard to *philosophy*, we may observe that Zeller—as a result of his Hegelian standpoint — obviously undervalues its connection with the general history of thought, and isolates too much the "speculative" ideas. If our view of the very intimate connection of speculation with religious rationalism, and with the beginning of scientific thought, is at all correct, then the stimulus to this changed mode of thought may have come from the East, but may in Greece, thanks to the more favourable soil, have matured more noble fruits. Compare the observation of Lewes, Hist. of Phil., i. p. 3: "It is a suggestive fact that the dawn of scientific speculation in Greece should be coincident with a great religious movement in the East." Conversely, also, it is quite possible that particular philosophical ideas may have come from the East to Greece, and there have been developed just because suitable intellectual circumstances had been prepared by the Greeks' own development. The historians will also have to adopt scientific theories. The crude opposition of originality and tradition can no longer be employed. Ideas, like organic germs, fly far and wide, but the right ground alone brings them to perfection, and often gives them higher forms. And in this case, of course, the possibility of the origin of Greek philosophy *without* such stimulus is not excluded, although, of course, the question of originality bears quite a new aspect. The true independence of Hellenic culture rests in its *perfection*, not in its beginnings.

ledge and skill at a time when no one thought of such things as yet in Greece; although it was in this very sphere of mathematics that the Greeks were destined to outrun all the nations of antiquity.

With the freedom and boldness of the Hellenic mind was united an innate ability to draw inferences, to enunciate clearly and sharply general propositions, to hold firmly and surely to the premisses of an inquiry, and to arrange the results clearly and luminously; in a word, the gift of scientific deduction.

It has in our days become the fashion, especially amongst the English since Bacon, to depreciate the value of deduction. Whewell, in his well-known "History of the Inductive Sciences," is constantly unjust to the Greek philosophers, and notably to the Aristotelian school. He discusses in a special chapter the causes of what he regards as their failure, continually applying to them the standard of our own time and of our modern scientific position. We must, however, insist that a great work had to be done before the uncritical accumulation of observations and traditions could be transformed into our fruitful method of experiment. A school of vigorous thinking was first to arise, in which men were content to dispense with premisses for the attainment of their proximate object. This school was founded by the Greeks, and it was they who gave us, at length, the most essential basis of deductive processes, the elements of mathematics and the principles of formal logic.[6] The apparent inversion of the natural

[6] Although the modern Aristotelians are so far right that the essential feature of the Aristotelian Logic, from its author's standpoint, is not the Formal Logic, but the logico-metaphysical Theory of Knowledge. At the same time he has also left us certain elements of Formal Logic, of course only collected and developed by him, which, as I hope to show in a later work, have a merely external connection with the principle of his Notion, and frequently, indeed, contradict it. Much, however, as it may now be the fashion to despise Formal Logic, and to over-estimate the metaphysical doctrine of the Notion, yet a calm consideration establishes beyond question that the fundamental principles of Formal Logic are alone demonstrated strictly as the principles of Mathematics, and these only so far as they are not (as is the doctrine of the conclusions from modal judg-

order, in the fact that mankind learnt to *deduce* correctly before they learnt to find correct *starting-points* from which to reason, can be seen to be really natural only from a psychological survey of the whole history of thought.

Of course, speculation upon the universe and its inter-relations was not, like mathematical inquiry, able to reach results of permanent value: innumerable vain attempts must first shake the confidence with which men ventured upon this ocean before philosophic criticism could succeed in showing how what was apparently the same method, brought about in the one case sure progress, and in the other mere blind beating about the bush.[7] And yet, even in the last few centuries, nothing so much contributed to lead philosophy, which had just broken off the Scholastic yoke, into new metaphysical adventures, as the intoxication caused by the astonishing advances of mathematics in the seventeenth century. Here also, of course, the error furthered again the progress of culture; for the systems of Descartes, Spinoza, and Leibniz, not only brought with them numerous incitements to thought and inquiry, but it was these systems that first really displaced the Scholasticism already doomed by the sentence of criticism, and thereby made way for a sounder conception of the world.

In Greece, however, men succeeded for once in freeing the vision from the mist of wonder, and in transferring their study of the world from the dazzling fable-land of religious and poetical ideas to the sphere of reason and of sober theory. This, however, could, in the first place, only be accomplished by means of Materialism; for external things lie nearer to the natural consciousness than the "Ego," and even the Ego, in the ideas of primitive peoples, is connected rather with the body than with the shadowy

ments) adulterated and corrupted by the Aristotelian Metaphysic.

[7] Compare the formulation of the same problem in Kant, Kritik d. rein. Vern. Einl., especially the passage iii. S. 38, Hartenstein. A full discussion of the questions of method will be found in the Second Book.

Soul, the product of sleeping and of waking dreams, that they supposed to inhabit the body.[8]

The proposition admitted by Voltaire, bitter opponent as he otherwise was of Materialism, "I am a body, and I think," would have met with the assent also of the earlier Greek philosophers. When men began to admire the design in the universe and its component parts, especially in the organic sphere, it was a late representative of the Ionic natural philosophy, Diogenes of Apollonia, who identified the reason that regulated the world with the original substance, Air.

If this substance had been conceived as sentient, and its sensations supposed to become thoughts by means of the growing complexity and motion of the substance, a vigorous Materialism might have been developed in this direction; perhaps a more durable one than that of the Atomists. But the reason-matter of Diogenes is omniscient; and so the last puzzle of the world of appearances is again at the outset hopelessly confused.[9]

The Atomists broke through the circle of this *petitio principii* in fixing the essence of matter. Amongst all the properties of things, they assigned to matter only the simplest, and those indispensable for the presentation of something in time and space, and endeavoured from these alone to develop the whole aggregate of phenomena. In

[8] Comp. the article "Seelenlehre" in the Encyc. des Ges. Erziehungs- und Unterrichtswesens, Bd. viii. S. 594.

[9] Comp. Note 1. Details as to Diogenes of Apollonia in Zeller, i. 218 ff. The possibility here suggested of an equally consequent Materialism without Atomism will be considered in the Second Book, when we discuss the views of Ueberweg. Now we will only observe that a third possibility, which also was never developed in antiquity, lies in the theory of sentient atoms; but here, as soon as we build up the intellectual life of man from a series of sentient conditions in his corporeal atoms we strike upon the same rock as the Atomism of Demokritos, when he builds up, *e.g.*, a sound or a colour from the mere grouping of atoms in themselves neither luminous nor sounding; while, if we transfer again the whole contents of human consciousness, as an internal condition, to a single atom—a theory which recurs in modern philosophy in the most various modifications, though it was so far from the mind of the ancients—then Materialism is transformed into a mechanical Idealism.

this respect the Eleatics, it may be, had prepared the way for them, that they distinguished the persistent matter that is known in thought alone as the only real existence from the deceitful change of sense-appearances; and the referring of all sense qualities to the manner of combination of the atoms may have been prepared for by the Pythagoreans, who recognised the essence of things in number, that is, originally in the numerically fixed relations of form in bodies. At all events, the Atomists supplied the first perfectly clear conception of what is to be understood by matter, or the substratum of all phenomena. With the introduction of this notion, Materialism stood complete as the first perfectly clear and consequent theory of all phenomena.

This step was as bold and courageous as it was methodically correct; for so long as men started at all from the external objects of the phenomenal world, this was the only way of explaining the enigmatical from the plain, the complex from the simple, and the unknown from the known; and even the insufficiency of every mechanical theory of the world could appear only in this way, because this was the only way in which a thorough explanation could be reached at all.

With few great men of antiquity can history have dealt so despitefully as with Demokritos. In the distorted picture of unscientific tradition, almost nothing appears of him except the name of the "laughing philosopher," while figures of incomparably less importance extend themselves at full length. So much the more must we admire the tact with which Bacon, ordinarily no great hero in historical learning, chose exactly Demokritos out of all the philosophers of antiquity, and awarded him the premium for true investigation, whilst he considers Aristotle, the philosophical idol of the Middle Ages, only as the originator of an injurious appearance of knowledge, falsely so called, and of an empty philosophy of words. Bacon may have been unfair to Aristotle, because he was lacking in that

historical sense which, even amidst gross errors, recognises the inevitable transition to a deeper comprehension of the truth. In Demokritos he found a kindred spirit, and judged him, across the chasm of two thousand years, much as a man of his own age. In fact, shortly after Bacon, and in the very shape which Epikuros had given it, Atomism became the foundation of modern natural science.

Demokritos was a citizen of the Ionian colony of Abdera on the Thracian coast. The "Abderites" had not as yet earned the reputation of "Gothamites," which they enjoyed in the later classical times. The prosperous commercial city was wealthy and cultivated: Demokritos' father was a man of unusual wealth; there is scarcely room to doubt that the highly-gifted son enjoyed an excellent education, even if there is no historical foundation for the story that he was brought up by Persian Magi.[10]

[10] It must not be supposed from this that I concur entirely in a kind of criticism employed with regard to this tradition by Mullach, Zeller, and others. It is not right to reject immediately the whole story of the stay of Xerxes in Abdera, merely because of the ridiculous exaggeration of Valerius Maximus, and the inaccuracy of a passage in Diogenes. We know from Herodotus that Xerxes made a halt in Abdera, and was very much pleased with his stay there (viii. 120; probably the passage which Diogenes had in his mind). That upon this occasion the king and his court would quarter themselves upon the richest citizens of the place is a matter of course; and that Xerxes had his most learned Magi in his train is again historical. But we are so far from being justified, therefore, in supposing even an early stimulating influence to have been exercised by these Persians upon the mind of an inquisitive boy, that we might rather argue the contrary, since the great internal probability might only the more easily enable the germ of these stories to develop itself, from mere conjectures and combinations, into a factitious tradition, while the late appearance of the story, in untrustworthy authors, makes its external evidence very slight. As to the associated question of the age of Demokritos, in spite of all the acuteness spent in its treatment (comp. Frei, Quæstiones Protagoreæ, Bonnæ, 1845, Zeller, i. S. 684 sqq., Anm. 2, and 783 sqq., Anm. 2), a successful answer in defence of the view of K. F. Hermann, which we followed in the 1st edition, is by no means rendered impossible. Internal evidence (comp. Lewes, Hist. Phil., i. 97) declares, however, rather for placing Demokritos later. The view, indeed, of Aristotle, who makes Demokritos the originator of the Definitions, continued by Sokrates and his contemporaries (comp. Zeller, i. S. 686 Anm.), must not be too hastily adopted, since Demokritos, at all events, only began to develop his doctrines when he had reached mature age. If, then, we place this work of Sokrates at the height of his intercourse

Demokritos appears to have spent his whole patrimony in the "grand tour" which his zeal for knowledge induced him to make. Returning in poverty, he was supported by his brother, but soon, by his successful predictions in the sphere of natural philosophy, he gained the reputation of being a wise and heaven-inspired man. Finally, he wrote his great work, the "Diakosmos,"—the public reading of which was rewarded by his native city with a gift of one hundred, according to others, five hundred talents, and with the erection of commemorative columns.

The year of Demokritos' death is uncertain, but there is a general admission that he reached a very advanced age, and died cheerfully and painlessly.

A great number of sayings and anecdotes are connected with his name, though the greater portion of them have no particular import for the character of the man to whom they relate. Especially is this so of those which sharply contrast him as the "laughing" with Herakleitos as the "weeping" philosopher, since they see nothing in him but the merry jester over the follies of the world, and the holder of a philosophy which, without losing itself in profundities, regards everything from the good side. As little pertinent are the stories that represent him merely as a *Polyhistor*, or even as the possessor of mystic and secret doctrines. What in the crowd of contradictory reports as to his person is most certain is, that his whole life was devoted to scientific investigations, which were as serious and logical as they were extensive. The collector of the scattered fragments which are all that remain to us of his numerous works, regards him as occupying the first place for genius and knowledge amongst all the philosophers before his birth, and goes so far as to conjecture that the Stagirite has largely to thank a study of the works of Demokritos for the fulness of knowledge which we admire in him.[11]

with the Sophists, about 425, Demokritos could, at all events, be as old as Sokrates, but, of course, not have been born as late as 460.

[11] Mullach, Fragm. Phil. Graec., Par. 1869, p. 338: "Fuit ille quamquam in cæteris dissimilis, in hoc æquabili omnium artium studio simillimus

It is significant that a man of such extensive attainments has said that "we should strive not after fulness of knowledge, but fulness of understanding;" [12] and where he speaks, with pardonable complacence, of his achievements, he dwells not upon the number and variety of his writings, but he boasts of his personal observation, of his intercourse with other learned men, and of his mathematical method. "Among all my contemporaries," he says, "I have travelled over the largest portion of the earth in search of things the most remote, and have seen the most climates and countries, heard the largest number of thinkers, and no one has excelled me in geometric construction and demonstration—not even the geometers of the Egyptians, with whom I spent in all five years as a guest." [13]

Amongst the circumstances which have caused Demokritos to fall into oblivion, ought not to be left unmentioned his want of ambition and distaste for dialectic discussion. He is said to have been in Athens without making himself known to one of its philosophers. Amongst his moral aphorisms we find the following: "He who is fond of contradiction and makes many words is incapable of learning anything that is right."

Such a disposition suited little with the city of the Sophists, and certainly not with the acquaintance of a Sokrates or a Plato, whose whole philosophy was developed in dialectic word-play. Demokritos founded no school.

His words were, it appears, more eagerly copied from than copied out; and his whole philosophy was finally absorbed by Epikuros. Aristotle mentions him frequently

Aristotelis. Atque haud scio an Stagirites illam qua reliquos philosophos superat eruditionem aliqua ex parte Democriti librorum lectioni debuerit."

[12] Zeller, i. S. 746, Mullach, Fr. Phil., p. 349, Fr. 140–142.

[13] Fragm. Varii Arg. 6, in Mullach, Fragm. Phil., pp. 370 sqq.; comp. Zeller, i, 688, Anm., where the remark that it shows "that Demokritos in this respect had little to learn from foreigners," goes much too far. It is not even certain from Demokritos's observation that he was superior to the "Harpedonaptae" *on his arrival in* Egypt; but even if he were, he might, it is obvious, still learn much from them.

with respect; but he cites him, for the most part, only when he attacks him, and this he by no means always does with a fitting objectivity and fairness.[14] How often he has borrowed from him without naming him we do not know. Plato speaks of him nowhere, though it is a matter of dispute whether, in some places, he has not controverted his opinions without mention of his name. Hence arose, it may be, the story that Plato in fanatical zeal would have liked to buy up and burn all the works of Demokritos.[15]

In modern times Ritter, in his "History of Philosophy," emptied much anti-materialistic rancour upon Demokritos's memory; and we may therefore rejoice the more at the quiet recognition of Brandis and the brilliant and convincing defence of Zeller; for Demokritos must, in truth, amongst the great thinkers of antiquity, be numbered with the very greatest.

As to the doctrines of Demokritos, we are, indeed, better informed than we are as to the views of many a philosopher whose writings have come to us in greater fulness. This may be ascribed to the clearness and comprehensiveness of his theory of the world, which permits us to add with the greatest ease the smallest fragment to the whole. Its core is Atomism, which, though not of course invented by him, through him certainly first reached its full development. We shall prove in the course of our history of Materialism that the modern atomic theory has been gradually developed from the Atomism of Demokritos. We may consider the following propositions as the essential foundations of Demokritos's metaphysic.

[14] Comp., *e.g.*, the way in which Aristotle, De Anima, i. 5, attempts to render ridiculous the doctrine of Demokritos as to the movement of the body by the soul; further, the interpolation of *thinness* as a cause of movement, which is gently censured by Zeller, i. pro. xvi. with Anm. 1, and the statement that Demokritos had attributed truth to the sensible phenomenon as such. See Zeller, i. par. 2. 5.

[15] However incredible such fanaticism may appear to us, it is quite consonant with the character of Plato; and as Diogenes' authority for this statement is no less a person than Antisthenes, it may be that we have here something more than a "story." Cf. Ueberweg, i. 4 Aufl. S. 73, N. T. 68.

I. *Out of nothing arises nothing; nothing that is can be destroyed. All change is only combination and separation of atoms.*[16]

This proposition, which contains in principle the two great doctrines of modern physics—the theory of the indestructibility of matter, and that of the persistence of force (the conservation of energy)—appears essentially in Kant as the first "analogy of experience:" "In all changes of phenomena matter is permanent, and the quantity thereof in nature is neither increased nor diminished." Kant finds that in all times, not merely the philosopher, but even common sense, has presupposed the permanence of matter. The doctrine claims an axiomatic validity as a necessary presupposition of any regulated experience at all, and yet it has its history! In reality, to the natural man, in whom fancy still overrides logical thought, nothing is more familiar than the idea of origin and disappearance, and the creation "out of nothing" in the Christian dogma is scarcely ever the first stumbling-block for awakening scepticism.

With philosophy the axiom of the indestructibility of matter comes, of course, to the front, although at first it may be a little veiled. The "boundless" (*ἄπειρον*) of Anaximander, from which everything proceeds, the divine primitive fire of Herakleitos, into which the changing world returns, to proceed from it anew, are incarnations of persistent matter. Parmenides of Elea was the first to deny all becoming and perishing. The really existent is to the Eleatics the only "All," a perfectly rounded sphere, in which there is no change nor motion; all alteration is only phenomenal. But here arose a contradiction between appearance and being, in face of which philosophy could not be maintained. The one-sided maintenance of the one axiom injured another: "Nothing is without cause." How, then, from such unchanging existence could the phenomenal arise? To this was added the

[16] See the proofs in Zeller, i. 691, Anm. 2.

absurd denial of motion, which, of course, led to innumerable logomachies, and so furthered the development of Dialectic. Empedokles and Anaxagoras drop this absurdity, inasmuch as they refer all becoming and perishing to combination and separation. Only first by means of Atomism was this thought fully represented, and made the corner-stone of a strictly mechanical theory of the universe; and it was further necessary to bring into connection the axiom of the necessity of everything that happens.

II. "*Nothing happens by chance, but everything through a cause and of necessity.*" [17]

This proposition, already, according to a doubtful tradition, held by Leukippos, must be regarded as a decided negation of all teleology, for the "cause" (λόγος) is nothing but the mathematico-mechanical law followed by the atoms in their motion through an unconditional necessity. Hence Aristotle complains repeatedly that Demokritos, leaving aside teleological causes, had explained everything by a necessity of nature. This is exactly what Bacon praises most strongly in his book on the "Advancement of Learning," in which, in other respects, he prudently manages to restrain his dislike of the Aristotelian system (lib. iii. c. 4).

This genuinely materialistic denial of final causes had thus, we see, led, in the case of Demokritos, to the same misunderstandings that, in our own day, Materialism finds almost everywhere predominant—to the reproach that he believed in a blind chance. Although no confusion is more common, nothing can be more completely opposite than chance and necessity; and the explanation lies in this, that the notion of necessity is entirely definite and absolute, while that of chance is relative and fluctuating.

When a tile falls upon a man's head while he is walking

[17] Fragm. Phys., 41, Mullach, p. 365: "οὐδὲν χρῆμα μάτην γίνεται ἀλλὰ πάντα ἐκ λόγου τε καὶ ὑπ' ἀνάγκης."

down the street, this is regarded as an accident; and yet no one doubts that the direction of the wind, the law of gravitation, and other natural circumstances, fully determined the event, so that it followed from a physical necessity, and also from a physical necessity must, in fact, strike any head that at the particular moment happened to be on the particular spot.

This example clearly shows that the assumption of chance is only a partial denial of final cause. The falling of the stone, in our view, could have had no reasonable cause if we call it an accident.

If, however, we assume, with the philosophy of the Christian religion, an absolute predestination, we have as completely excluded chance as by the assumption of absolute causality. In this point the two most consequent theories entirely coincide, and both leave to the notion of chance only an arbitrary use, practically no use whatever. We call accidental anything the cause or object of which we do not know, merely for the sake of brevity, and therefore quite unphilosophically; or we start from a one-sided standpoint, and maintain, in the face of the teleologist, the accidental theory of events, in order to get rid of final causes, while we again have recourse to this same theory of chance so soon as we have to deal with the principle of sufficient reason.

And rightly, so far as physical investigation or any strict science is concerned; for it is only from the side of efficient causes that the phenomenal world is accessible to inquiry, and all infusion of final causes, which are by way of supplement placed above or beside the nature forces subject to necessity—that is, those operating with the utmost regularity of ascertained laws—has no significance whatever, except as a partial negation of science, an arbitrary exclusion of a sphere not yet subjected to thorough investigation.[18]

[18] Of course, this is also true of the most recent and the boldest attempt to set aside the fundamental principle of all scientific thought—the 'Philo-

An absolute teleology, however, Bacon was willing to admit, although his conception of it was not sufficiently clear. This notion of a design in the totality of nature, which in detail only gradually becomes intelligible to us by means of efficient causes, does not refer, of course, to any absolutely human design, and therefore not to a design intelligible to man in its details. And yet religions need an absolutely anthropomorphic design. This is, however, as great an antithesis to natural science as poetry is to historical truth, and can, therefore, like poetry, only maintain its position in an ideal view of things.

Hence the necessity of a rigorous elimination of final causes before any science at all can develop itself. If we ask, however, whether this was the impelling motive for Demokritos when he made an absolute necessity the foundation of all study of nature, we cannot here enter upon all the questions thus suggested; only of this there can be no doubt, that the chief point was this, viz., a clear recognition of the postulate of the necessity of all things as a condition of any rational knowledge of nature. The origin of this view is, however, to be sought only in the study of mathematics, the influence of which in this direction has in later times also been very decided.[19]

III. *Nothing exists but atoms and empty space: all else is only opinion.*

Here we have in the same proposition at once the strong and the weak side of all Atomism. The foundation of every rational explanation of nature, of every great discovery of modern times, has been the reduction of phenomena into the motion of the smallest particles; and undoubtedly even in classical ages the most important results might have been attained in this direction, if the reaction that took its rise in Athens against the devotion of philosophers to physical science had not so dis-

sophy of the Unconscious!' We shall have an opportunity in the Second Book of returning to this late fruit of our speculative Romanticism.

[19] Fragm. Phys., 1, Mullach, p. 357.

tinctly gained the upper hand. On the Atomic theory we explain to-day the laws of sound, of light, of heat, of chemical and physical changes in things in the widest sense, and yet Atomism is as little able to-day as in the time of Demokritos to explain even the simplest sensation of sound, light, heat, taste, and so on. In all the advances of science, in all the presentations of the notion of atoms, this chasm has remained unnarrowed, and it will be none the less when we are able to lay down a complete theory of the functions of the brain, and to show clearly the mechanical motions, with their origin and their results, which correspond to sensation, or, in other words, which effect sensation. Science does not despair, by the means of this powerful weapon, of success in deriving even the most complicated processes and most significant motives of a living man, according to the laws of the persistence of force, from the impulses that are set free in his brain under the influence of the nervous stimuli; but she is for ever precluded from finding a bridge between what the simplest sound is as the sensation of a subject—mine, for instance—and the processes of disintegration in the brain which science must assume in order to explain this particular sensation of sound as a fact in the objective world.

In the manner in which Demokritos cut this Gordian knot we may perhaps trace the influence of the Eleatic School. They explained motion and change in general as mere phenomena, and, in fact, non-existent phenomena. Demokritos limited this destructive criticism to sense qualities. "Only in opinion consists sweetness, bitterness, warmth, cold, colour; in truth, there is nothing but the atoms and empty space."[20]

Since to him, therefore, the Immediately Given—sensation—had something deceptive about it, it is easily intelligible that he complained that the truth lies deep hidden,

[20] Mullach, 357: "*νόμῳ γλυκὺ καὶ ῥὸν, νόμῳ χροιή· ἐτεῇ δὲ ἄτομα καὶ νόμῳ πικρὸν, νόμῳ θερμὸν, νόμῳ ψυχ- κενόν.*"

and that he can yield more weight to reflection with regard to knowledge than to immediate perception. His reflection dealt with notions that kept close to the perceptions of sense, and were for that very reason suited to explain nature. From the one-sidedness of those whose hypotheses are mere deductions from notions Demokritos was saved by this, that he constantly tested his theory of the atomic movements by picturing it to himself in the forms of sense.

IV. *The atoms are infinite in number, and of endless variety of form. In the eternal fall through infinite space, the greater, which fall more quickly, strike against the lesser, and lateral movements and vortices that thus arise are the commencement of the formation of worlds. Innumerable worlds are formed and perish successively and simultaneously.*[21]

The magnitude of this conception has often in antiquity

[21] The main features of Atomism we must, in defect of authentic fragments, take in the main from Aristotle and Lucretius; and we may remark, that even in these accounts, far removed as they are from the ridiculous disfigurements and misunderstandings of a Cicero, yet the mathematical clearness of the premisses and the connection of the individual parts has probably suffered. We are, therefore, justified in completing the defective tradition, though always in the sense of that mathematico-physical theory on which Demokritos's whole system hangs. So the procedure of Zeller, *e.g.*, is undoubtedly quite right when treating the relation of size and weight of the atoms (i. 698–702); on the other hand, there is even here, in the doctrine of motion, still a remnant left of the want of clearness so persistent in all later accounts. Zeller observes (p. 714), that the idea that in infinite space there is no above and below, appears not to have forced itself upon the Atomists; that what Epikuros, in Diogenes, x. 60, says on this point is too superficial and unscientific to be credited to Demokritos. But this judgment is too decided; for Epikuros by no means opposes, as Zeller (iii. i. 377, &c.) supposes, to the objection of there being no above and below in infinite space ocular evidence only; but he makes the quite correct, and therefore, it may be, quite Demokritean remark, that in spite of this relativity of "above" and "below" in infinite space, yet that the direction from head to foot is a definitely given notion, and that from foot to head may be regarded as the opposed notion, however much we may suppose the line on which these dimensions are measured to be prolonged. In this direction follow the general movement of the free atoms, and clearly only in the sense of the movement from the head to the foot of a man standing in the line, and this direction is that from above to below —the directly opposite one that from below upwards.

been considered as something quite monstrous, and yet it stands much nearer to our modern ideas than that of Aristotle, who proved *a priori* that besides his self-contained world there could be no second. When we come to Epikuros and Lucretius, where we have fuller information, we shall discuss more thoroughly their cosmical theory. Here we will only mention that we have every reason to suppose that many features of the Epikurean Atomism, in cases where we are not told the contrary, are due to Demokritos. Epikuros made the atoms infinite in number, but not infinitely various in form. More important is his innovation in reference to the origin of the lateral motion.

Here Demokritos gives us a thoroughly logical view, although one which cannot be maintained in face of our modern physics; but yet it shows that the Greek thinker carried out his speculations as far as was then possible in subjection to strictly physical principles. Starting from the erroneous view that greater bodies—the same density being assumed—fall quicker than smaller ones, he made greater atoms in their descent overtake and strike the smaller. But as the atoms are of various shapes, and the collision will not take place in the centre of the atoms, then, even according to the principles of modern mechanical science, revolutions of the atoms on their axes and lateral motions will be set up. When once set up, these lateral motions must ever become more and more complicated, and as the collision of constant new atoms with a layer of atoms already in lateral motion constantly imparts new forces, so we may suppose that the motion will continually increase.

From the lateral motions in connection with the rotation of the atoms are then easily produced cases of retrogressive movement. If now, in a layer of atoms so involved, the heavier — *i.e.*, the larger—atoms continually receive a stronger impetus downwards, they will finally be collected below, while the light ones will form the upper stratum. The basis of this whole theory, the doctrine of the quicker

descent of the greater atoms,[22] was attacked by Aristotle, and it appears that Epikuros was thus induced, whilst retaining the rest of the system, to introduce his fortuitous deviations of the atoms from the straight line. Aristotle, that is, taught that if there could be void space, which he thought impossible, then all bodies must necessarily fall with equal speed, since the difference in the rapidity of the descent is determined by the various densities of the medium—as, for example, water and air. Now void space not being a medium, there is no difference therefore in the descent of different bodies. Aristotle in this case was at one with our modern science, as also in his doctrine of gravitation towards the centre of the universe. His deduction, however, is only in places rational, and is mixed with subtleties of the same kind as those by which he seeks to demonstrate the impossibility of motion in empty space. Epikuros cut the matter short, and comes to this simple conclusion: because in empty space there is no resistance, all bodies must fall equally fast—apparently in entire agreement with modern physics; but only apparently, since the true theory of gravitation of descent was wholly wanting to the ancients.

[22] Comp. Fragm. Phys., 2, Mullach, p. 358, and the admirable remark of Zeller, i. 717, Anm. 1, on the purely mechanical nature of this aggregation of the homogeneous atoms. But it is less certain whether the vortical movement (the "Kreis- oder Wirbelbewegung," Zeller, p. 715, and Anm. 2) really played the part in Demokritos's system attributed to it by later reporters. It seems much more likely that he made the vortical movement of the mass of atoms of which the world was composed only develop itself after the atoms, and especially those of the outer covering of the universe, had formed a compact body held together by the hooks of the atoms. Such a body might then very easily, partly by the original motion of its particles, partly by the impact of the atoms rushing in from without attain a rotatory motion. The stars, according to Demokritos, are moved by the rotating covering of the world. Epikuros, of course, who was, however, it is certain, a very weak mathematician as compared with Demokritos, in spite of his being later, thought it also possible that the sun may maintain its continual revolution round the earth in consequence of the impulse once received in the general movement of the universe; and if we consider how vague were the pre-Galilean ideas as to the nature of motion, we need not be surprised that even Demokritos should have made a vortical motion be developed out of the rectilinear impact; but convincing proofs of this view are entirely wanting.

It is not uninteresting to compare how Galilei, as soon as, after many painful efforts, he had reached the true law of fall, directly ventured *a priori* to the conclusion that in empty space all bodies will fall equally fast, a considerable period before this, by means of the air-pump, could be proved to be the fact. It is a question to be considered how far reminiscences of Aristotle or Lucretius may not have assisted Galilei to this conclusion.[23]

V. *The variety of all things is a consequence of the variety of their atoms in number, size, figure, and arrangement; there is no qualitative difference of atoms. They have no "internal conditions;" and act on each other only by pressure or collision.*[24]

We have already seen, in connection with the third proposition, that Demokritos regarded the sense qualities, such as colour, sound, heat, and so on, as mere deceptive appearances, which is only to say that he entirely sacrificed the subjective side of phenomena, which is, nevertheless, all that is immediately given, in order to be able to carry out a more consequent objective explanation; and accordingly Demokritos engaged, in fact, in the most exhaustive investigations as to what must be, in the object, the substratum of the sensible qualities.

According, then, to the difference in the relations of the atoms in a "schema"—which may remind us of the "schemata" or atoms of our chemists—are determined our subjective impressions.[25]

Aristotle complains that Demokritos had reduced all

[23] Comp. Whewell, Hist. of the Induct. Sci., ii. 34 (ed. 1837).

[24] Here again the authentic proofs are lacking; we have chiefly to rely upon reports of Aristotle, which are here, however, very full, and raise no suspicion of misunderstanding. Fuller details in Zeller, i. 704 ff.

[25] Here we have tolerably full extracts in Theophrastos; comp. Fragm. Phys., 24–39, Mullach, p. 362 sqq. Noteworthy is the general principle in Fr. 24: "The schema is *in itself* (καθ αὑτό), the sweetness, however, and the sensible quality is only in relation to another and in another." Here we have, too, the source of the Aristotelian opposition of substance and accident, just as Aristotle found the original of his apposition of δύναμις and ἐνέργεια in Demokritos. (Fragm. Phys., 7, Mullach, p. 358).

kinds of sensation into the one sensation of touch—a reproach which, in our eyes, will rather be counted to his praise. The gist of the problem will lie, then, just in this sense of *touch*.

We can, indeed, easily enough rise to the standpoint of regarding all sensations as modifications of touch, although there will still remain unsolved enigmas enough. But we cannot so naively dispose of the question how the simplest and most elementary of all sensations is related to the pressure or collision which occasions it. The sensation is not in the *individual* atom, and still less is it an aggregate of them; for how could it be brought into a focus through void space? It is produced and determined by means of a *Form* in which the atoms act in mutual co-operation. Materialism here borders closely on Formalism, as Aristotle has not forgotten to point out.[26] Whilst he, however, made the forms transcendentally causes of motion, and thereby struck at the root of all natural science, Demokritos was careful not to follow up the formalistic side of his own theory, which would only lead him into the depths of metaphysic. Here we first find the need of the Kantian "Critick of Reason" to throw the first weak ray of light into the depths of a mystery which, after all the progress of our knowledge of nature, is yet to-day as great as it was in the time of Demokritos.

VI. *The soul consists of fine, smooth, round atoms, like those of fire. These atoms are the most mobile, and by their motion, which permeates the whole body, the phenomena of life are produced.*[27]

Here then, also, is the soul, as with Diogenes of Apollonia, a particular kind of matter; and Demokritos be-

[26] Arist. Phys. Ausc., ii. 2, where it is explained that nature is twofold, consisting of form and matter: the earlier philosopher had regarded matter only, with the limitation—ἐπὶ μικρὸν γάρ τι μέρος Ἐμπεδοκλῆς καὶ Δημόκριτος τοῦ εἴδους καὶ τῶν τί ἦν εἶναι ἥψαντο.

[27] Cf. Zeller, i. 728 ff.

lieves, also, that this matter is distributed throughout the universe, and everywhere produces the phenomena of heat and of life. Demokritos therefore recognises a distinction between soul and body, which our modern Materialists would scarcely relish; and he knows how to utilise this distinction, for his ethical system, just as the Dualists had done. The soul is the really essential part of man; the body is only the vessel of the soul, and this must be our principal care. The soul is the seat of happiness; bodily beauty without reason is in its nature merely animal. To Demokritos, indeed, has been ascribed the doctrine of a divine world-soul, only that he means by this merely the universal diffusion of that mobile matter which he could very well describe figuratively as the divine element in the world, without attributing to it other than material properties and mechanical movements.

Aristotle ridicules the view of Demokritos as to the manner in which the soul influences the body by making a comparison. Daedales is said to have made a moving statue of Aphrodite; this the actor Philippos explained had been done probably by pouring quicksilver into the interior of the wooden figure. In the same way Aristotle thinks would Demokritos have man moved by the mobile atoms within him. The comparison is clearly inadequate,[28] but it may nevertheless serve to explain two fundamentally different principles of regarding nature. Aristotle thinks that not this, but through choice and reflection the soul moves man—as if this were not clear to the savage long before the very slenderest beginnings of science. Our whole "comprehension" is a referring of the particular in phenomena to the general laws of the phenomenal world. The last step of this endeavour is the including of the

[28] See note 14 above. To do justice to Demokritos's idea we need only to compare how Descartes (De Pass., art. x., xi.) represents the action of the material "animal spirits" in the moving of the body. [Descartes' own words are—"Nam quos hic nomine spiritus nil nisi corpora sunt, et aliam nullam proprietatem habent nisi quod sint corpora tenuissima et quae moventur celerime, instar partium flammae ex face exeuntis."—TR.]

processes of reason in this chain. Demokritos took this step: Aristotle misconceived its meaning.

The doctrine of mind, says Zeller (i. 735), has not in the case of Demokritos proceeded from the general necessity of a "deeper principle" for the explanation of nature. Demokritos regarded mind not as "the world-building force," but only as one form of matter amongst others. Even Empedokles had regarded rationality as an internal property of the elements; Demokritos, on the contrary, only as a "phenomenon taking its origin from the mathematical constitution of certain atoms in their relation to the others." And this is just Demokritos's superiority; for every philosophy which seriously attempts to understand the phenomenal world must come back to this point. The special case of those processes we call "intellectual" must be explained from the universal laws of all motion, or we have no explanation at all. The weak point of all Materialism lies just in this, that with this explanation it stops short at the very point where the highest problems of philosophy begin. But he who devises some bungling explanation of nature, including the rational actions of mankind, starting from mere conjectural *a priori* notions which it is impossible for the mind to picture intelligibly to itself, destroys the whole basis of science, no matter whether he be called Aristotle or Hegel.

Good old Kant would here undoubtedly in principle declare himself on the side of Demokritos and against Aristotle and Zeller. He declares empiricism as thoroughly justified, so far as it does not become dogmatic, but only opposes "temerity, and the presumption of reason mistaking its true destiny," which "talks largely of insight and knowledge where insight and knowledge can really do nothing," which confounds the practical and theoretical interests, "in order, where its convenience is interfered with, to tear away the thread of physical investigations." [29]

[29] Kritik der Vernunft, Elementarl., further the remarkable note on p. ii. 2, 2, 2, Haupst., 3 Abschnitt, 335. Hartenstein, iii. 334 ff. Comp.

This intellectual presumption in the face of experience, this unjustifiable tearing of the thread of physical inquiries, plays to-day also its part, as well as in Hellenic antiquity. We shall have much to say about it before we have done. It is ever the point at which a healthy philosophy cannot too sharply and energetically take Materialism into its protection.

With all its elevation of the mind above the body, the ethic of Demokritos is nevertheless at bottom a theory of Hedonism, standing quite in harmony with the materialistic cosmology. Amongst his moral utterances, which have been preserved in much greater number than the fragments of his physical philosophy, we find, it is true, many of those primitive doctrines of wisdom which might find their place in the most diverse systems, which Demokritos—together with counsels of prudence drawn from his own personal experiences—taught in a too practical and popular shape for them to be considered as having formed distinctive marks of his system; but we can, nevertheless, unite the whole into a consecutive series of thoughts resting upon a few simple principles.

Happiness consists in the cheerful calmness of spirit which man can attain only by securing the mastery over his desires. Temperance and purity of heart, united with culture of the emotions and development of the intelligence, supply every man with the means, in spite of all the vicissitudes of life, of reaching this goal. Sensual pleasure affords only a brief satisfaction; and he only who does good for the sake of its intrinsic merit, without being swayed by fear or hope, is sure of this inward reward.

Such an ethical system is indeed very far removed from the Hedonism of Epikuros, or from the system of a refined egotism which we find associated with the Materialism of the eighteenth century; but it is nevertheless lacking in the distinctive mark of all idealistic morality, a principle of conduct taken directly from the consciousness, and asserted independently of experience. The distinctions

of good and evil, right and wrong, Demokritos appears to suppose to be known without further inquiry; cheerful serenity of soul is the most lasting good, and that it can only be attained by right thinking and acting are results of experience; and the reason for striving after this harmonious inward condition lies exclusively in the happiness of the individual.

Of all the great principles underlying the Materialism of our time, one only is wanting in Demokritos; and that is the abolition of all teleology by the principle of the development of the *purposeful* from the unpurposeful. We cannot, in fact, dispense with such a principle as soon as we seriously undertake to carry out one kind of causality, that of the mechanical impact of atoms. It is not sufficient to show that it is the finest, most mobile, and smoothest atoms which produce the phenomena of the organic world; we must also show why, with the help of these atoms, instead of arbitrary, aimless objects, there are produced the exquisitely articulated bodies of plants and animals, with all their organs for the maintenance of the individual and the species. Only when we have demonstrated the possibility of this, then, in the full sense of the word, can the *rational* movements be understood as a special form of the universal movement.

Demokritos extolled the adaptation of organic bodies, and especially of the human frame, with the admiration of a reflective observer of nature. We find in him no trace of that false teleology, which may be described as the hereditary foe of all science; but we discover nowhere an attempt to explain the origin of these adaptations from the blind sway of natural necessity. Whether this means that there was a gap in his system, or only that there has been a gap in the tradition, we do not know; but we do know that this last basis of all Materialism, crudely, it is true, but yet in fully intelligible clearness, sprung from the philosophical thought of the Greeks. What Darwin, relying upon a wide extent of positive knowledge, has

achieved for our generation, Empedokles offered to the thinkers of antiquity—the simple and penetrating thought, that adaptations preponderate in nature just because it is their nature to perpetuate themselves, while what fails of adaptation has long since perished.

Hellenic intellectual life attained to an active development in Sicily and Lower Italy not much later than on the coasts of Asia Minor. Indeed, 'Magna Graecia,' with its proud and wealthy cities, far outstripped the mother-country, until at last the rays of philosophy were again concentrated, as in a focus, at Athens. The rapid development of these colonies must have been influenced by an element like that which caused Goethe's ejaculation—

> "Amerika! du hast es besser,
> Als unser Continent, das alte,
> Hast keine verfallenen Schlösser
> Und keine Basalte."

The greater freedom from tradition, removal from antique religious observances, and from the contact of the priestly families and their despotic, deeply-rooted authority, seem to have especially favoured the transition from the prejudices of religious faith to scientific inquiry and philosophical speculation. The Pythagorean brotherhood was, with all its austerity, still at the same time a religious revolution of a tolerably radical nature; and amongst the intellectual chiefs of this confederation there arose the most fruitful study of mathematics and natural science which Greece had known before the Alexandrian epoch. Xenophanes, who migrated from Asia Minor to Lower Italy, and there founded the school of Elea, is an eager Rationalist. He attacks the mythological representation of the gods, and substitutes a philosophical conception.

Empedokles of Agrigentum cannot be described as a Materialist, because with him force and matter are still fundamentally separated. He was probably the first Greek who divided matter into the four elements, which, by means of Aristotle, secured so long a tenure of life, that even

in the science of to-day we constantly come upon their traces. Besides these elements, Empedokles supposed that there were two ultimate forces—Love and Hate—which, in the formation and dissolution of the world, performed the functions of attraction and repulsion. Had Empedokles made these forces properties of the elements, we might quietly rank him as a Materialist; for not only did the picturesque language of his poems draw its illustrations from the feelings of the human heart, but he set the whole Olympos and the lower world in motion in order to give life to his conceptions, and to find occupation for the imagination as well as for the reason. But his forces are independent of matter. For immeasurable periods now the one preponderates, now the other. If love has attained a complete predominance, then all matter, collected into a great sphere, enjoys a blessed peace. If hate has reached the height of power, everything is thrown into confusion and dislocation. In each case no individual things exist. All terrestrial life is in connection with the circumstances of transition, which lead from the unity of the world-sphere, through the growing power of hatred, to absolute dissolution, or the contrary way, through the increasing power of love. This latter way is that of our world-epoch, in which we gather from the fundamental principles of the system we must clearly have an enormous extent of time behind us. The special features of his cosmogony interests us here only so far as it deals with the development of organisms, since here we are met by that principle which, in the hands of Epikuros and Lucretius, has subsequently exercised so great an influence.

The principles of 'hate' and 'love' do not operate according to a plan, or, at least, have no other plan than that of universal separation and reunion. Organisms arise through the fortuitous play of the elements and elementary forces. First were formed plants, and then animals. The animal organs were first developed by nature individually: eyes without faces, arms without bodies, and so on. Then

there resulted, in the progress of the combining tendency, a confused play of bodies, now united in one way, and now in another. Nature tried all possible combinations simultaneously, until there resulted a creature capable of life, and finally of propagation. As soon as this is produced it perpetuates itself, whilst the previous products had perished as they were produced.

Ueberweg remarks as to this doctrine (Hist. of Phil., E. T. i. 62, n.), that it may be compared with the physical philosophy of Schelling and Oken, and the theory of descent proposed by Lamarck and Darwin; yet that these find the explanation of progress rather in the successive differentiation of simpler forms, while the Empedoklean doctrine seeks it rather in the union of heterogeneous forms. The observation is very just; and we might add, that the later theory of descent is supported by the facts, while the doctrine of Empedokles, considered from our present scientific standpoint, is absurd and fantastic. It is worth while, however, to point out what links the two doctrines in the most distinct and united opposition to the views of Schelling and Oken, and that is the purely mechanical attainment of adaptations through the infinitely repeated play of production and annihilation, in which finally that alone survives which bears the guarantee of persistence in its relatively fortuitous constitution. And if, in regard to Empedokles, criticism must still doubt whether he really so understood the matter, yet this much is quite certain, that Epikuros so construes the Empedoklean theory, and has accordingly fused it with his Atomism, and with his doctrine of the realisation of all possibilities.

About the name of Empedokles, as about that of Demokritos, there has gathered a mass of myth and legend, much of which is due to a mastery of natural forces, which seemed very wonderful to his contemporaries. But while Demokritos must have earned this renown, in spite of the most sober simplicity and openness in his life and teaching, by merely practical achievements, Empedokles appears

to have loved the nimbus of the wonder-worker, and to have utilised it for his reforming purposes. He also sought to spread purer ideas of the gods, though he did not reach the rationalism of Xenophanes, who discarded all anthropomorphism. Empedokles believed in the transmigration of souls, and forbade the offering of sacrifices as well as the eating of flesh. His earnest demeanour, his fiery eloquence, the fame of his works, imposed upon the people, who revered him as a god. Politically, he was a zealous partisan of democracy, and contributed to its victory in his native city. Yet he, too, must have experienced the fickleness of popular favour: he died in the Peloponnese, probably in exile. How his religious views were to be reconciled with his scientific theories we do not know. "How many theological doctrines," remarks Zeller, "have there not been believed by Christian philosophers, whose philosophical conclusions would be in complete antagonism with those doctrines!"

CHAPTER II.

THE SENSATIONALISM OF THE SOPHISTS AND ARISTIPPOS'S ETHICAL MATERIALISM.

WHAT stuff or matter is in the outer world of nature, sensation is in the inner life of man. If we believe that consciousness can exist without sensation, this is due to a subtle confusion. It is possible to have a very lively consciousness, which busies itself with the highest and most important things, and yet at the same time to have sensations of an evanescent sensuous strength. But sensations there always are; and from their relations, their harmony or want of harmony, are formed the contents and meaning of consciousness; just as the cathedral is built of the rough stone, or the significant drawing is composed of fine material lines, or the flower of organised matter. As, then, the Materialist, looking into external nature, follows out the forms of things from the materials of which they are composed, and with them lays the foundations of his philosophy, so the Sensationalist refers the whole of consciousness back to sensations. Sensationalism and Materialism, therefore, agree at bottom in laying stress on matter in opposition to form: the question then arises, how are their mutual relations to be explained?

Obviously not by a mere convention, which at once sets a man down as a Sensationalist in regard to the internal, and a Materialist in regard to the external world. Although this standpoint is the commonest in our inconsequent practice, it is anything but a philosophical one.

Much rather will the consequent Materialist deny that sensation exists independently of matter, and will accord-

ingly, even in the facts of consciousness, find only effects of ordinary material changes, and regard these in the same light as the other material facts of the external world: the Sensationalist will, on the other hand, be obliged to deny that we know anything whatever of matter, or of the things of the external world in general, since we have only our own *perception* of the things, and cannot know how this stands related to the things in themselves. Sensation is to him not only the material (*Stoff*) of all the facts of consciousness, but also the only immediately given material, since we have and know the things of the external world only in our sensations. As a result of the undeniable correctness of this proposition, which is at once an advance upon the ordinary consciousness, and already presupposes a conception of the world as a unity, Sensationalism must appear a natural development of Materialism.[30] This development was brought about among the Greeks through that very school which in general struck deepest into ancient life, alike in its constructive and destructive influences,—by means of the Sophists.

It was said in later antiquity that the sage Demokritos once saw a porter in his native town packing together in a very ingenious manner the wood blocks he had to carry. Demokritos talked to him, and was so surprised by his quickness that he took him as a pupil. This porter was the man who furnished the occasion for a great revolution in the position of philosophy: he became a teacher of

[30] Compare, in the modern history of philosophy, the relation of Locke to Hobbes, or of Condillac to Lamettrie. This does not, of course, mean that we must always expect a chronological series of this kind, and yet it is the most natural, and therefore the most frequent. We must, however, observe how the sensationalistic elements are, as a rule, already present in the deeper Materialists; and very expressly, in especial in the case of Hobbes and Demokritos. Further, we see easily that Sensationalism is at bottom only a transition to Idealism — as, for example, Locke stands on untenable ground between Hobbes and Berkeley; for so soon as the sense-perception is the strictly given, not only will the quality of the object be uncertain, but its very existence must appear doubtful. And yet this step was not taken by antiquity.

wisdom for gold. He was Protagoras, the first of the Sophists.[31]

Hippias, Prodikos, Gorgias, and a long series of less famous men, chiefly known through Plato's writings, were soon travelling through the cities of Greece, teaching and disputing, and in some cases they made great fortunes. Everywhere the cleverest youths flocked to them; to partake of their instructions soon became the mark of fashion; their doctrines and speeches became the daily topics of the upper classes, and their fame spread with incredible rapidity.

This was a new thing in Greece, and the old Maratho-

[31] The porter story must probably be considered fabulous, although this is a case where the traces of some such tale reach very far back. Comp. Brandis, Gesch. d. griech.-röm. Philos., i. 523 ff., and, on the other side, Zeller, i. 866, Anm. 1, where certainly too much stress is laid upon the "scurrility" of Epikuros. The question whether Protagoras was a pupil of Demokritos hangs together with the difficult question of age discussed in note 10. We prefer here also to leave it undecided. But even in case the predominant view, which makes Protagoras some twenty years older than Demokritos, should ever be sufficiently proved, the influence of Demokritos upon the Protagorean theory of knowledge remains extremely probable, and we must then assume that Protagoras, originally a mere rhetorician and teacher of politics, developed his own system later, indeed during his second stay at Athens, in intellectual intercourse with his opponent Sokrates, at a time when the writings of Demokritos might already have had their influence. Zeller's attempt, following Frei (Quaestiones Protagoreae, Bonnae, 1845), to deduce the philosophy of Protagoras wholly from Herakleitos, disregarding Demokritos, splits on the want of a sufficient point of support for the subjective direction of Protagoras in the theory of knowledge. If it is proposed to regard as Herakleitic the origin of sensation from a mutual motion of sense and object (comp. Zeller, i. 585), the resolution of sense qualities into subjective impressions is wholly wanting in Herakleitos. On the other hand, the 'νόμῳ γλυκὺ καὶ νόμῳ πικρόν,' and so on (Fragm. Phys., 1), of Demokritos forms the natural transition from the purely objective view of the world of the older physicists to the subjective one of the Sophists. Protagoras must indeed reverse the standpoint of Demokritos in order to reach his own; but this is also his position towards Herakleitos, who finds all truth in the universal, while Protagoras seeks it in the particular. The circumstance that the Platonic Sokrates (comp. Frei, Quaest. Prot., p. 79) makes the principle of Protagoras, that all is motion, to be the original of all things, is historically not decisive. Generally it may be said that the influence of Herakleitos on the doctrine of Protagoras is unmistakable, and it is at the same time probable that the elements due to this are the *original* elements to which Demokritos's reference of the sense qualities to subjective impressions was added later as a fermenting element.

nian warriors, the veterans of the liberation struggle, were not the only conservatives who shook their heads. The supporters of the Sophists themselves held towards them, with all their admiration, much the same position as, in our own day, the patrons of an opera-singer: the majority would, in the midst of their admiration, have disdained to follow in their steps. Sokrates used to embarrass the pupils of the Sophists by blunt questions as to the object of their teacher's profession. From Pheidias we learn sculpture, from Hippokrates medicine—what, then, from Protagoras?

The pride and love of display of the Sophists were no substitute for the respectable and reserved attitude of the old philosophers. Aristocratic dilletanteism in philosophy was thought more respectable than their professional business.

We are not yet far removed from the time when only the darker side of the Sophistic system was known to us. The ridicule of Aristophanes and the moral earnestness of Plato have joined with the innumerable anecdotes of later times to concentrate upon the name of the Sophists all that was to be found of frivolous pedantry, of venal dialectic, and systematic immorality. Sophist became the designation of all pseudo-philosophy; and long after the vindication of Epikuros and the Epikureans was, to the general profit of men of culture, an accomplished fact, that reproach still clung to the name of the Sophists, and it remained an insoluble puzzle how Aristophanes could have represented Sokrates as the head of the Sophists.

Through Hegel and his school, in connection with the unprejudiced inquiries of modern philology, the way was cleared in Germany for a more accurate view. A still more decided position was taken by Grote in his "History of Greece," and before him Lewes had entered the lists for the honour of the Sophists. He maintains Plato's *Euthydemus* to be just as much an exaggeration as the *Clouds* of Aristophanes. "The caricature of Sokrates by Aristo-

phanes is quite as near the truth as the caricature of the Sophists by Plato; with this difference, that in the one case it was inspired by political, in the other by speculative, antipathy."[32] Grote shows us that this fanatical hatred was thoroughly Platonic. Xenophon's Sokrates occupies a much less hostile position towards the Sophists.

Protagoras marks a great and decisive turning-point in the history of Greek philosophy. He is the first who started, not from the object—from external nature, but from the subject—from the spiritual nature of man.[33] He is in this respect an undoubted predecessor of Sokrates; he stands, indeed, in a certain sense, at the head of the whole antimaterialistic development, which is equally made to begin with Sokrates. At the same time, however, Protagoras has, in addition, the most intimate relations to Materialism, through his starting from sensation as Demokritos started from matter; whilst he was very decidedly opposed to Plato and Aristotle in this, that to him—and this trait also is related to Materialism—the *particular* and the *individual* is the essential, not the *universal*, as with them. With the Sensationalism of Protagoras is combined a relativity which may remind us of Büchner and Moleschott. The expression that something is, always needs a further determination *in relation to what* it is or is becoming; otherwise our predication has no meaning.[34]

In precisely the same way Büchner says, in order to combat the 'thing in itself,' that all things exist only for each other, and have no significance apart from mutual relations;[35] and still more decidedly Moleschott: "Except in

[32] Hist. of Phil., i. 106, 107.

[33] Comp. Frei, Quaest. Prot., p. 110. "Multo plus vero ad philosophiam promovendam eo contulit Protagoras quod hominem dixit omnium rerum mensuram. Eo enim mentem sui consciam reddidit, rebusque superiorem praeposuit." But for this reason this must be regarded as the true basis of the philosophy of Protagoras — in its completion — and not the Heraklitean *πάντα ῥεῖ*.

[34] Frei, Quaest. Prot., p. 84 foll.

[35] Comp. Büchner, Die Stellung des Menschen in der Natur, Leipz., 1870, p. cxvii. The expression of Moleschott will be more fully discussed in the Second Book.

relation to the eye, into which it sends its rays, the tree *has no existence.*" All such expressions are still in our own day regarded as Materialism. To Demokritos, however, the atom was a 'thing in itself.' Protagoras dropped the Atomism. He regarded matter as something in itself completely undetermined, involved in eternal flow and change. It is what it appears to the individual.

The most distinctive features of the philosophy of Protagoras are the following propositions underlying his Sensationalism:—

1. Man is the measure of all things: of those that are that they are; of those that are not that they are not.

2. Contradictory assertions are equally true.

Of these propositions, the second is the most striking, and is also the one that most forcibly reminds us of the unscrupulous pedantry which is only too often considered as the essence of the Sophistic system. It gains, however, a deeper sense so soon as it is explained from the first principle which contains the core of the Protagorean doctrines. Man is the measure of things, that is, it depends upon our sensations how things appear to us, and this appearance is all that is given us; and so it is not man in his universal and necessary qualities, but each individual in each single moment, that is the measure of things. If it is a question of the universal and necessary qualities, than Protagoras must be regarded wholly as a predecessor of the theoretical philosophy of Kant. Yet Protagoras as to the influence of the subject, as well as to the judgment of the object, kept close to the individual perception, and so far from viewing the 'man as such,' he cannot even, strictly speaking, make the individual the measure of things, for the individual is mutable; and if the same temperature appear to the same man at one time cool, at another warm, both impressions are in their own moment equally true, and there is no truth outside this.

We may now easily explain the second principle without contradiction, so soon as we proceed to the closer

determination as demanded by the system of Protagoras—in the sense of two different individuals.

It was not the object of Protagoras to maintain the simultaneous truth and falsity of the same assertion in the mouth of the same individual; although, indeed, he teaches that, of every proposition maintained by any one, the opposite may be maintained with equal right, in so far as there may be any one to whom it so appears.

That in this way of regarding things there is contained a great element of truth cannot but be recognised; for the real fact, the immediately given, is in reality the phenomenon. But our mind demands something persistent in the flood of phenomena. Sokrates sought the path to this persistent element; Plato, in complete contrast to the Sophists, believed he had found it in the universal, in face of which the particular sank back into unreal seeming. In this controversy, if we view it quite theoretically, the Sophists are right, and Plato's theoretical philosophy can find its higher significance only in the deep-lying suspicion of a hidden truth, and in its relations to the ideal elements of life.

In Ethic the fatal consequences of the standpoint of Protagoras are most obvious. Protagoras, indeed, did not draw these consequences. He explained desire to be the principle of action, but he drew a sharp distinction between the good citizens and noble men who have desires only for what is good and noble, and the bad and vulgar who feel attracted towards evil.[36] At the same time, the consequence must have followed from the theoretical conception of this unconditioned relativity, that that is *right and good* for the man which in each case seems to him right and good.

As practical men, and, in fact, teachers of virtue, the Sophists helped themselves by simply adopting the traditional Hellenic morality as a whole for their own. There could be no question of deducing it from a principle: even

[36] Frei, Quaest. Prot., p. 99; Zeller, i. 916 foll.

the doctrine that those sentiments are to be favoured which further the prosperity of the state was not raised to an ethical principle, however nearly it may approach it.

So it is intelligible that the most important consequences from this principle of arbitrariness were drawn not only by fanatical opponents like Plato, but occasionally even by venturesome pupils of the Sophists. The famous art of making the worse appear the better cause is defended by Lewes as an art of disputation for practical people, as the art of being one's own advocate: the reverse of the picture is only too obvious.[37] The defence is sufficient to show that, on the general ground of average Greek morality, the Sophists might boldly assert their blamelessness; it is not sufficient to refute the view that Sophistic was a dissolving element in Hellenic civilisation.

But if we look closely at the position that desire is the moving principle of action, we easily see that the ground was already prepared by the Sensationalism of Protagoras for the Cyrenaic doctrine of pleasure. The development of this germ was carried out by the 'Sokratic' Aristippos.

On the hot coasts of Northern Africa lay the Greek commercial colony of Cyrene; here Oriental luxury was combined with the refinement of Hellenic civilisation. Sprung from a wealthy mercantile family of this city, brought up with the sentiments and education of a man of the world, the young Aristippos went to Athens, attracted by the fame of Sokrates. Of handsome form, and gifted with the charm of the most refined demeanour and the most intellectual conversation, Aristippos found his way to every heart. He attached himself to Sokrates, and was regarded as a Sokratic, different as the direction taken by his doctrine was from the essence of the Sokratic theory. His personal inclination to a life of pleasure and display, and the powerful influence of the Sophists, brought about the development of his doctrine that pleasure is the object of

[37] Lewes, Hist of Phil., i. 114.

existence. Aristotle calls him a Sophist; yet we may also recognise in him the influence of Sokratic views. Sokrates found the highest happiness in virtue, and taught that virtue is identical with true knowledge. Aristippos taught that self-control and temperance—that is, the genuine Sokratic virtues—alone render us capable of enjoyment, and keep us so; only the wise man can be really happy. Happiness, however, is with him, of course, only pleasure.

He distinguished two forms of sensation: one which results from gentle motion, the other from violent rapid motion; the former is pleasure, the latter pain or absence of pleasure.

Now since sensual pleasure obviously produces a livelier sensation than intellectual pleasure, it was merely a consequence of the inexorable logic of Hellenic speculation when Aristippos inferred from this that physical pleasure is better than intellectual pleasure, physical pain worse than mental. Epikuros tried to escape this by a sophism.

Finally, Aristippos taught expressly that the true aim is not happiness, which is the permanent result of many single sensations of pleasure, but the individual sensual concrete pleasure itself. Happiness is of course good, but it must come spontaneously, and is therefore not the aim.

No Sensationalistic moralist of ancient or modern times has been more logically consistent than Aristippos, and his life constitutes the best commentary on his doctrine.

With Sokrates and his school, Athens had become the centre of philosophic tendencies. Though from this point, too, proceeded the great reaction against Materialism, which in Plato and Aristotle secured the most decided victory, yet even here the intellectual influences of Materialism were sufficiently powerful to challenge such a reaction.

Demokritos, it is true, felt no attraction towards Athens. "I came to Athens," he is reported to have said, "and no man knew me." As a man of reputation then, he had hastened to the then newly flourishing centre of science to

view closely the course of speculation there, and quietly again departed without revealing himself; and it may well be that the great and earnest system of Demokritos worked much less powerfully on the seething tendencies of the time than the less logical but more intelligible features of that Materialism, in the wider sense of the word, which dominates the whole pre-Sokratic period of philosophy. Above all things, however, had Sophistic, in the good and the bad sense of the word, found a favourable soil in Athens. Since the Persian war a change had taken place, under the influence of the new modes of thought, which extended through all grades of society. Under Perikles's powerful direction, the state had reached the consciousness of its destiny. Commerce and the sovereignty of the sea had favoured the development of material interests. A magnificent spirit of enterprise appeared amongst the Athenians. The time at which Protagoras taught almost coincided with the period which saw the elevation of the mighty buildings of the Acropolis.

The stiffness of antiquity disappeared, and art, in its passage to the beautiful, reached that elevation of style which we find in the works of Pheidias. In gold and ivory arose the wonderful statues of Pallas Parthenos, and of the Olympian Zeus; and while beliefs in all classes are beginning to totter, the festival processions of the gods reached the highest pitch of splendour and magnificence. More material and luxurious in every respect than Athens was Korinth; but Korinth was not the city of philosophers. There intellectual apathy and degradation passed into sensuality, to which the traditional forms of worship not merely adapted themselves, but even gave encouragement, and thus, even in antiquity, the interdependence of theoretical and practical Materialism, as well as the opposition of the two, is unmistakably obvious. If by practical Materialism we understand a dominant inclination to material acquisition and enjoyment, then theoretical Materialism is opposed to it, as is every effort of the spirit towards know-

ledge. Nay, we may say that the sober earnest which marks the great Materialistic systems of antiquity is perhaps more suited than an enthusiastic Idealism, which only too easily results in its own bewilderment, to keep the soul clear of all that is low and vulgar, and to lend it a lasting effort after worthy objects.

Religious traditions, whose origin may be traced to high ideal elevation, are sometimes easily polluted in the course of centuries with the material and low sentiments of the masses, quite apart from the 'Materialism of dogma,' which may be found in every firmly-rooted orthodox system, so soon as the bare substance of religious doctrines is more highly valued than the spirit which has produced them. The mere decomposition, however, of tradition does not better this fault; since a religion will rarely have so petrified that no spark of ideal life will, from its higher forms, fall upon the soul; and, on the other hand, the progress of enlightenment does not make the masses into philosophers.

But the true notion of ethical Materialism is, of course, quite different: we must understand by it a moral doctrine which makes the moral action of man rise from the particular emotions of his spirit, and which determines the object of action, not by an unconditionally ruling idea, but by the effort after a desired condition. Such an ethical system may be named Materialistic, because, like theoretical Materialism, it starts from matter as opposed to form; only, that here is meant, not the matter of external bodies, not even the quality of sensation as matter of theoretical consciousness, but the elementary matter of practical conduct, the *impulses* and *the feelings of pleasure and its opposite*. We may say that this is only an analogy, that there is no obvious unity of tendency, but history shows us almost universally that this analogy is powerful enough to determine the connection of the systems.

A fully-developed ethical Materialism of this sort is not only not ignoble, but it seems by a sort of internal neces-

sity to lead to noble and elevated forms of life, and to a love of those forms which rise far above the commonplace demand for happiness; just as, on the other hand, an idealistic ethical system in its full development cannot help being anxious for the happiness of individuals and the harmony of their impulses.

But we are concerned, in the historical development of nations, not with a purely ideal ethic, but with thoroughly fixed traditional forms of morality, the stability of which is disturbed and shaken by any new principle, because they do not rest upon the abstract reflection of the man himself, but on a taught and inherited product of the collective life of many generations. And thus our experience hitherto seems to teach us that all Materialistic morality, pure as it may otherwise be, operates especially in periods of transformation and transition, as a powerful solvent, while all great and decisive revolutions and reforms first break out in the shape of new ethical ideas.

Such new ideas were introduced in antiquity by Plato and Aristotle, but they could neither penetrate to the masses, nor gain over to their objects the old forms of the national religion. All the deeper on this account was the influence of these products of Hellenic philosophy upon the later development of mediaeval Christianity.

When Protagoras was driven from Athens for having begun his book on the gods with the words, "As to the gods, I do not know whether they exist or not," it was already too late for the salvation of the conservatism for which Aristophanes vainly set to work all the forces of the stage, and even the sacrifice of Sokrates could no longer stay the progress of the Spirit of the Times.

As early as the Peloponnesian war, soon after the death of Perikles, the great revolution in the whole life of the Athenians was decided; and of this revolution the especial promoters were the Sophists.

This rapid process of dissolution is unique in history: no people has ever lived so fast as the Athenians. And

instructive as may be this turning-point of their history, the danger is proportionately great of our drawing false conclusions from it.

So long as a state, as in the case of Athens before Perikles, steadily develops, and holds fast to old traditions, all its citizens feel themselves held together by a common interest as against other states. On the other hand, the philosophy of the Sophists and that of the Cyrenaics had a cosmopolitan colouring.

The thinker embraces in a short series of conclusions events which history requires thousands of years to realise; and so the cosmopolitan idea may be in general quite right, and yet in the particular case prejudicial, because it destroys the interest of the citizens in their country, and in consequence cripples the country's vital force.

So long as men adhere to their traditions, there are certain ultimate limits set to the ambition and the talents of the individual. All these limits are removed by the principle that each individual man has in himself the measure of all things. The only security against this is the merely conventional; but the conventional is the unreasonable, because thought always impels us to new developments.

This was soon understood by the Athenians, and not the philosophers only, but even their most zealous opponents, learnt to argue, to criticise, to dispute, and to make projects. The Sophists created even an art of demagogy; for they taught rhetoric with the express object of understanding how one may turn the masses in the direction suitable to one's own interest.

Since contradictory assertions are equally true, many an imitator of Protagoras cared only to establish his own personal view, and so a kind of right of moral force was introduced. At all events, the Sophists must have possessed, in the art of influencing men's minds, great skill and deep psychological insight, or they could not have received an income which, compared with the fees of our

own days, stands at least in the relation of principal to interest. And, moreover, the underlying idea was not that of a reward for trouble, but that of the purchase of an art which was the making of its possessor.

Aristippos, who flourished in the fourth century, was a true cosmopolitan. The courts of the tyrants were his favourite resort, and at that of Dionysius of Syracuse he not unfrequently met with his intellectual opposite, Plato. Dionysius valued him beyond all other philosophers, because he knew how to make something out of every moment; also, of course, because he humoured all the tyrant's caprices. In the principle that nothing natural is blamable, Aristippos agreed with the 'dog' Diogenes; and hence he also was named by the popular wit the 'royal dog.' This is not a casual coincidence, but a similarity of principles, which exists in spite of the difference of the consequences drawn from them. Aristippos, too, had no necessities; for he had always what he needed, and felt just as secure and happy when wandering in rags as when living in regal splendour.

But the example of the philosophers, who were fond of foreign courts, and found it absurd to serve consistently the narrow interests of a single state, was soon followed by the political envoys of Athens and other republics, and no Demosthenes could avail to save the freedom of Greece.

As to religious beliefs, it deserves notice that simultaneously with the weakening of beliefs, which spread from the theatre through the influence of Euripides among the people, there appeared a number of new mysteries.

History has but too frequently shown that if the educated men begin to laugh at the gods, or to resolve their existence into philosophical abstractions, immediately the half-educated masses, becoming unsteady and unquiet, seize upon every folly in order to exalt it into a religion.

Asiatic cults, with fantastic, even immoral practices, found most favour. Kybele and Kotytto, Adonis-worship

and Orphic prophecies, based upon impudently fabricated sacred books, became popular in Athens as well as in the rest of Greece. And so was prepared that great commingling of religions which connected the East and West after the campaign of Alexander, and which was so important in preparing the way for the later propagation of Christianity.

Upon art and science also the Sensationalistic doctrines exercised a great transforming influence. The materials of the empirical sciences were popularised by the Sophists. They were for the most part men of great learning, who were fully masters of their stores of solid knowledge, and had them always ready for practical use; but they were in the natural sciences not inquirers, but only popularisers. On the other hand, we owe to their efforts the foundation of grammar and the development of an admirable prose, such as was demanded by the progress of the times, instead of the narrow forms of poetry, and above all the great development of rhetoric. Poetry under their influence sank gradually from its ideal height, and in tone and contents approached the character of the modern. Plot, effort, wealth of wit and emotion, became more and more important.

No history shows more plainly than that of Hellas that, by a natural law of human development, there is no unbroken persistence of the good and the beautiful. It is the transitional points in the ordered movements from one principle to another that conceal within them the greatest sublimity and beauty. And therefore we have no right to complain of a worm-eaten blossom: the very law of blossoming it is that leads to decay; and in this respect Aristippos was at the highest point of his time when he taught that it is the present moment only that can alone bring happiness.

CHAPTER III.

THE REACTION AGAINST MATERIALISM AND SENSATIONALISM: SOKRATES, PLATO, ARISTOTLE.

WHEN we regard from the standpoint of a reaction against Materialism and Sensationalism those products of Hellenic speculation which are usually considered the highest and most perfect, we are in danger of undervaluing these products, and of criticising them with the bitterness ordinarily directed against Materialism. The temptation is indeed strong, for we have here, as soon as we disregard the other aspects of the great crisis, a reaction in the worst sense of the term. It is a reaction in which the lower standpoint is elevated above the higher, after the former had been surmounted consciously and by a genuine intellectual effort —a suppression of the beginnings of a better view by ideas in which the old errors of unphilosophical thought return in a new shape, with new prestige and power, but not without their old pernicious character. Materialism explained natural phenomena by immutable necessary laws: the reaction introduced a reason fashioned after human models haggling with necessity, and so demolished the basis of all natural science by the convenient instrument of arbitrary caprice.[38]

Materialism conceived adaptations to be the highest

[38] This doctrine is set forth repeatedly and at length in the *Timaeus* of Plato; comp., *e.g.*, the passages p. 48 A, 56 C, and 68 E. Everywhere here two kinds of cause are expressly spoken of—the Divine and rational, that is, the teleological; and the Natural cause: and no suggestion whatever is made as to their coincidence. Reason is higher than necessity, but does not rule unconditionally, but only to a certain extent, and even so far only by persuasion.

products of nature, but without, therefore, sacrificing the unity of its principle: the reaction struggled fanatically to retain a teleology which even in its most brilliant forms conceals flat anthropomorphism, and whose radical extermination is the indispensable condition of all scientific progress.[39]

Materialism gave the preference to mathematical and physical investigations — that is, those departments in which the human mind is first able to secure results of permanent value: the reaction, to begin with, wholly threw over physical inquiries in favour of ethic, and when, under Aristotle, it again took up the neglected study, it thoroughly corrupted it by the reckless introduction of ethical ideas.[40]

While we have in these points undoubted retrogression, the progress—at least that in which utterance was given to the determined opposition of the great philosophical school of Athens against Materialism and Sensationalism—is of a very doubtful nature. We have Sokrates to thank for the phantom of definitions which presuppose an alto-

[39] The anthropomorphic character of this teleology, as well as the anti-materialistic zeal with which it was inculcated and defended, is seen most clearly from the passage of the *Phaedo* mentioned further on in the text (pp. 97 C–99 D Steph.), in which Sokrates complains so bitterly of Anaxagoras, who had made no use whatever in his cosmology of the so promising 'reason,' but had explained everything by purely material causes.

[40] Of ethical origin is teleology in particular. It is indeed true that even the Platonic teleology is less crudely anthropomorphic than the Sokratic, and in the teleology of Aristotle, again, we find a decided advance; but the ethical character, and the inconsistency with genuine physical inquiry, are common to all the three stages. In Sokrates everything just as it is has been created for human purposes. Plato recognises that things have an end of their own, and so their adaptation is more internal; while in Aristotle the end completely coincides with the notional essence of the thing. But even so we have imported a power of realising themselves into all natural things, which is absolutely inconceivable as a natural phenomenon, and has its only original in the practical consciousness of the forming and fashioning human being. There are, however, many other ethical ideas which Aristotle has carried into the study of nature, with the utmost injury to the progress of inquiry: thus, above all, the order of merit of all things in nature, and, in fact, the abstract relations of 'above' and 'below,' 'right' and 'left,' besides 'natural' and 'violent' motion, and so on.

gether imaginary agreement of name and thing, and Plato for the delusive method which rests one hypothesis upon another still more general, until at last the fullest knowledge is found in what is most abstract. Aristotle we have to thank for the juggle between the potential and the actual, and the fancy of a complete and all-comprehensive system of knowledge. That all these acquisitions of the Athenian school are, even to our own time, continually operative, especially in Germany, admits of no doubt; and therefore over the historical importance of this school we need waste no further word, but may rather ask, Was this historical importance a fortunate or an unfortunate thing?

So long as we regard these points in themselves and in their purely theoretical opposition to Materialism, our judgment must be necessarily an unfavourable one, and we may, indeed, go a long way further than this. It is usually said that with Protagoras the earlier Greek philosophy reached its dissolution, and that an entirely new foundation was required, which was afforded by Sokrates and his return to self-knowledge. We shall soon see how far the history of thought justifies this view. Such a view, moreover, can be supported only by the consideration of the whole extent of Greek intellectual life. Philosophy, and especially theoretical philosophy in the strict sense, can scarcely be abolished through the attainment of truth, only to begin again from the beginning with the old errors. This might, indeed, appear to be possible if we consider, for example, the transition from Kant to Fichte; but all such phenomena must be explained from the whole history of thought, since philosophy never holds an isolated position in the intellectual life of any given people. Quite theoretically considered, the relativity of the Sophists was a thoroughly sound advance in the theory of knowledge, and not at all the end of philosophy, but much rather its true beginning. We see this most clearly in ethic; for it was just the Sophists, who apparently undermined every

possible basis of morality, who made it their favourite occupation to teach virtue and statesmanship. They substituted in the place of what is good in itself that which is useful to the *state*. How very close this comes to Kant's ethical axiom: So act that the maxims of your conduct might be the principles of universal legislation.

It is, in fact, the step from the particular to the universal which should here in due course have followed, and, abstractly speaking, *might* have followed, without giving up the acquisitions of relativity and individualism made by the Sophists. In ethic this step has in effect been taken as soon as virtue, after the falling away of all externally-given objective rules, is not simply laid aside, but proceeds to identify itself with the principle of the conservation and progress of a community. This was the course the Sophists took, without, however, being conscious of its fundamental significance; but might not this consciousness in time have developed itself out of their doctrine? In that case, although, of course, the highest point would not have been at once attained, yet henceforward the ground would have been thoroughly firm and secure beneath their feet.

Sokrates resolved virtue into knowledge: is this principle, when quite theoretically tested, really higher than the standpoint of the Sophists? What, indeed, the objective notion of the good is, we can as little discover from the whole body of the Platonic dialogues as the nature of the philosopher's stone from the alchemistic writings. If we make the knowledge of virtue a consciousness of the right principles of conduct, then it is easily reconcilable with the foundation upon the common weal in the state. If we take the Sokratic illustration of the intemperate man, who only sins because he is not fully conscious of the painful consequences of his present desire, no Sophist would deny that the man who is so constituted that this consciousness is never lacking is the better constituted, but *for him* in consequence, quite subjectively and individually

considered, the good is the better. He chooses the better not through a knowledge of the notion of the good, but through a psychological condition, differing at the moment of choice from that of the intemperate man. It is true, indeed, that from the consideration of such instances the necessity for the individual also of a general notion of the good embracing the different moments of time may be seen. Such a notion was possessed even by Demokritos. A pupil of Demokritos and Protagoras, who had continued, if I may use the expression, a tangential movement from their philosophy, instead of sweeping round again with Sokrates, might easily have reached the position that man is the measure of things: the individual man in his momentary condition of the individual phenomenon, the average man of a sum of phenomena.

Protagoras and Prodikos busied themselves also with the rudiments of grammatical and etymological studies, and we do not know how much is really due to them of what we are now accustomed to assign to Plato and Aristotle. It is sufficient, however, for our purpose, to know that the Sophists had already turned their attention to words and the meaning of words. Now the word, as a rule, stands as a sign for a group of sensations. Might they not in this way have very soon reached a theory of universals in the sense of the medieval Nominalism? In such a theory, of course, the universal would not have been more real and certain than the particular, but, on the contrary, would have been further removed from the object, and more uncertain—in fact, in direct opposition to Plato, the more uncertain as it became more universal.

If, finally, the Sophists, among human actions, which, if regarded from a strictly individual standpoint, are all equally good, discriminate between the praiseworthy and the blameworthy, and that according to a rule which is gathered from the universal life in a state, might they not also have reached the idea of discriminating amongst perceptions which in themselves are all equally true, the

normal and the abnormal from the historical standpoint of universal thought? The position would then have remained quite unassailed, that 'true,' in the strictest sense, that is 'certain,' is merely the individual feeling of the particular person; but, besides, a fixed standard of values might have been attained for the different perceptions in accordance with their current acceptation in human intercourse.

If one would apply such a scale of current value to the just developed universals in the Nominalistic sense, the idea of probability would have almost irresistibly presented itself. So near, apparently, in this case, did the Sophistic standpoint lie to the ripest fruit of modern speculation. The path of progress was to all appearance open. Why must the great reaction intervene which was to lead the world for thousands of years in the errors of Platonic Idealism?

The answer to this question has been already indicated. The fact is, that we have to deal not with a philosophy that develops itself continuously, whether by antagonisms or in a direct line, but only with philosophising men, who, like their doctrines, are children of their time. The misleading appearance of an advance through antagonisms, as Hegel supposes, rests upon this very fact, that the thoughts which dominate an era, or which appear as philosophical ideas, form only one portion of the intellectual life of a nation, and that very different influences, often the more powerful because so little apparent, are at the same time in activity, until they suddenly become in turn the dominant ones, while the others retire into the background.

Ideas that hasten onwards too rapidly for their age live themselves out, and must invigorate themselves once more by a struggle with reaction before they painfully, and yet more surely, again struggle to the front. But how is it that this is brought about? The more rapidly the bearers of new ideas and new theories snatch at the control of public

opinion, the more violent will be the opposition of traditional ideas in the minds of their contemporaries. After being long blinded and stunned, as it were, prejudice gathers itself together, either by external persecution and suppression, or by new intellectual creations to battle with and overcome the inconvenient opinions. If such new intellectual creations are in themselves poor and empty, and endured only from hatred of progress, they can, as in the case of Jesuitism against the Reformation, only prosecute their purpose in alliance with cunning and force and a policy of universal suppression. But if they have, in addition to their reactionary importance, a germ of life within themselves, a content which in other respects leads to progress, they may often produce more brilliant and satisfactory results than the activity of a faction which has become arrogant from the possession of new truths, and which, as happens only too frequently after a conspicuous success, becomes enfeebled and inadequate to the proper following up of what has been attained.

Of this latter kind was the situation in Athens when Sokrates faced the Sophists. We have shown above how, abstractly considered, the standpoint of the Sophists might have been further developed; but if we had to point out the forces which, but for the intervention of the Sokratic reaction, might have effected this development, we should have some difficulty. The great Sophists were content, of course, with their practical successes. The very boundlessness of their relativity, their vague acceptance of the middle-class morality without the establishment of any principle, the pliant individualism which everywhere assumes to itself the right to throw down or let stand as suits the purpose of the moment—these were, it is obvious, admirable foundations for the education of 'practical statesmen' of the well-known stamp, which, from the dim beginning of time until our own days, has everywhere secured the greatest external success. No wonder that the Sophists more and more went over from Philosophy to Politic, from

Dialectic to Rhetoric! And we find, indeed, even in Gorgias, a clear consciousness that philosophy had been degraded to the level of a mere preparation for practical life.

Under such circumstances, it is no cause for surprise that the younger generation of Sophists betrayed not the least inclination to carry on the development of philosophy on the basis of the view reached by Protagoras, with the omission of the transcendental and mythical universal introduced by Plato, and so to press on to the standpoint of modern Nominalism and Empiricism. On the contrary, the later Sophists distinguished themselves merely by a confident insistance upon the principle of subjectivity or individual will, and by outbidding their masters in framing a convenient theory for the holders of power in the Greek states. There was, therefore, retrogression as regards the strictly philosophical germ in this philosophy—a sign that the more earnest and deeper natures no longer felt themselves drawn in this direction.

All this is, of course, not in the same degree applicable to the severe and earnest Materialism of Demokritos; yet we have seen that Demokritos founded no school. This was due, indeed, partly to his own tendency and inclination, but partly also to the character of the time. For once Materialism, with its belief in eternally existing atoms, was outbid by Sensationalism, which denied the existence of any thing-in-itself behind phenomena. It would have needed a great advance, however—a much greater than the just-mentioned continuations of the Sensationalist philosophy—to reintroduce the atom as a necessary mode of presentation of an unknown relation, and so to maintain the basis of physical science. Consequently, at this period, the interest in objective investigations generally disappeared. In this respect, Aristotle may almost be regarded as the true successor of Demokritos; of course, a successor who uses the results and the principles by which they have been attained for completely opposite purposes. In the summertide of the new Athenian philosophy, how-

ever, ethical and logical questions came so much to the front that they caused everything else to be forgotten.

Whence came this one-sided prominence of ethical and logical problems? The answer to this question must at once show us what was the inmost principle of life through which the new tendency arose, and whose force gives it a higher and more independent value than that of a mere reaction against Materialism and Sensationalism. Here, however, it is impossible to separate the men from the doctrines, the purely philosophical elements from the whole intellectual movement, if we wish to understand why certain philosophical innovations could attain such an important significance. It was Sokrates who called the new tendency into life. Plato gave it its idealistic stamp, and Aristotle, by connecting it with empirical elements, created out of it that ultimate system which thenceforth dominated the thought of so many centuries. Opposition to Materialism culminates in Plato; the Aristotelian system made the most obstinate stand against Materialistic theories; but the attack was begun by one of the most remarkable men of whom history tells, a character of rare greatness and resolution—the Athenian Sokrates.

All the portraitures of Sokrates show him to us as a man of great physical and intellectual force, a stout, stubborn nature, of stern self-command and few necessities, brave in fight, enduring not only of fatigues, but also, if need be, of the drinking-bout, moderately as he otherwise lived. His self-control was not the tranquillity of a nature which has nothing to control, but the preponderance of a great mind over strong sensual traits and a naturally passionate temperament.[41] His thoughts and endeavours were concen-

[41] We do not refer to the insufficiently authenticated stories of Zopyros and the like, according to which Sokrates, at all events in his youth, was choleric and licentious (comp. Zeller, ii. 2 Aufl. 54, where, indeed, the stories of Aristoxenos are too unconditionally rejected), but we hold to his character as it is presented to us in Xenophon and Plato, and especially to the well-known description in the Symposion. We do not therefore assert that Sokrates at any period of his life did not control his

trated upon a few important points, and the whole latent energy of his nature entered into the service of these thoughts and endeavours. The earnestness that worked within him, the fire that glowed in him, lent to his address a marvellous influence. In his presence alone of all men could Alkibiades feel ashamed; the power of his undorned address drew tears from impressionable souls.[42] His was an apostle nature, burning with the desire to communicate to his fellow-citizens, and especially the young, the fire that lived within him. His work he himself felt was holy, and behind the playful irony that marked his dialectic lurked the eager energy of a spirit that knew and prized nothing but the ideas by which it was possessed.

Athens was a pious city, and Sòkrates was a genuine Athenian. Enlightened as he was, his theory of the world still remained a distinctly religious theory. The teleological conception of nature, to which he adhered with zeal, not to say fanaticism, was to him only a proof of the existence and activity of the gods, as in truth the need of regarding the gods as creating and working in human fashion may be called the mainspring of all teleology.[43]

That a man like this should be the very man to be arraigned for Atheism, need not, however, cause us overmuch surprise. At all times it has been the faithful reformers, and not the worldly freethinkers, who have been crucified and burnt; and the work of Sokrates, even in the sphere of religion, was that of a reformer. The whole tendency of the time set just then to the purification of religious ideas; not among the philosophers only, but even among the most influential Greek priest-

passionate disposition, but merely that this fierce natural foundation, which was converted into the enthusiasm of the apostle of morality, must have assigned to it its due importance.

[42] Comp. the eulogy of Alkibiades in the Platonic Symposion, especially 215 D, E.

[43] This is most clearly shown, as far as Sokrates is concerned, in his discussion with Aristodemos (Xen. Memor., i. 4), detailed at length in Lewes, Hist. Phil., i. 168–173.

hoods, there appears to have been a strong inclination, while retaining myth for the credulous masses, to frame a more spiritual idea of the gods, to arrange and unify the variety of local cults according to the inner relations of the theological idea, and to secure for the great national deities, such as the Olympian Zeus, and especially the Delphian Apollo, as wide a recognition as possible.[44] To these endeavours Sokrates's manner of dealing with religion was to a certain point agreeable enough; and there is still some question whether we ought not to regard the remarkable answer of the oracle of Delphi, which declared Sokrates to be the wisest of the Hellenes, as a covert approval of his believing rationalism. Yet this very man could be more easily denounced to the people as a foe of religion, the more often he was accustomed openly, and with an avowed object of influencing his fellow-citizens, to discuss the most dangerous questions. This religious earnestness of the great man determined, then, his whole conduct in life and death, in a degree which lends to the man a still higher importance than to the doctrine, and which was quite calculated to make his pupils into disciples zealous to spread wider the flame of this lofty inspiration. The way in which Sokrates, following his sense of duty, opposed, as Prytanis, the passionate excitement of the populace, the way in which he refused to obey the Thirty Tyrants,[45] and after his con-

[44] Mention has already been made of the 'Theokrasy' (the mingling and fusion into one of different gods and worships) of the Delphic priesthood in Note 2 above. The place of Apollo in the Sokratic spiritual movement has been recently pointed out very curiously and markedly by Nietzsche, Die Geburt der Tragödie aus dem Geiste der Musik: Leipzig, 1872. How this tendency, in connection with the Platonic theories, for centuries continued an exuberant growth, until, at last, although too late for a regeneration of Paganism, it burst into full activity, we may learn, in particular, from the half philosophical, half mystical cult of 'King Helios,' which the Emperor Julian would have opposed to Christianity. Comp. Baur, Gesch. d. Christl. Kirche, ii. (2 Ausg.) S. 23 ff.; Teuffel, Studien und Charakteristiken: Leipzig, 1871, S. 190.

[45] Sokrates was Epistates of the Prytanes, and had in that capacity to put the question to the vote, on the day when the excited populace

demnation declined to flee, but, obedient to the law, with peaceful soul faced death, is a convincing proof that with him the doctrine and the life were completely fused.

It has been recently supposed that we must explain the philosophical significance of Sokrates by showing that he was anything but a mere teacher of morality, but that he has, on the contrary, left a very distinct mark upon the history of philosophy by certain definite innovations. To this there is no objection; only we wish to show how all these new views, with their bright and dark sides, have their roots directly in the theological and ethical principle by which Sokrates was guided in his whole conduct.

If we next ask how it was that Sokrates came to renounce speculation as to the essence of things, and instead to make the moral nature of man the supreme object of his philosophy, we have from himself and his pupils the explanation that he had in his younger days busied himself with physical science, but that everything in this province appeared to him so uncertain that he had abandoned this kind of inquiry as unprofitable. Much more important was it for him, according to the Delphic oracle, to know himself: the object, however, of this effort after self-knowledge is to become as good as possible.

We need not now concern ourselves with the question whether Sokrates had really at one time zealously pursued physical investigation, as would seem to follow from the satirical picture drawn by Aristophanes. In the period of his life which we know from Plato and Xenophon it was no longer so; on the contrary, we know from Plato that Sokrates had read many of the writings of the earlier philosophers without finding any satisfaction in them.

wished to condemn the generals who had neglected to pick up the dead after the battle of Arginusae. The proposal was not only unjust in itself, but it had a defect of form, and therefore Sokrates, at the risk of his own life, steadily refused to put it to the vote. The Thirty Tyrants ordered him and four others to bring Leon back to Athens from Salamis; the other four obeyed, but Sokrates quietly went back home, although he knew that it was at the peril of his life.

He read, for instance, Anaxagoras, and when he found that Anaxagoras explained the creation by referring it to reason, he was uncommonly delighted, for he supposed that Anaxagoras would find in reason some explanation of all the arrangements of the universe, and show, for example, if the earth is flat, why it is best thus; or, if it is in the centre of the universe, why this must be so, and so on. Instead of this, he was rudely disenchanted when Anaxagoras spoke of physical causes only. That is as if some one should propose to explain *why* Sokrates is sitting in this particular place, and then when he began should explain the 'sitting' according to the principles of anatomy and physiology, instead of mentioning that the Athenians had thought good to condemn him, and how he had thought good in disdain of flight to sit here and await his fate.[46]

We see from this illustration how Sokrates came to the study of such treatises with a ready-made view. His entire conviction is that the reason which has created the world-structure proceeds after the manner of human reason; that we can follow its thoughts everywhere, although we must at the same time admit its infinite superiority. The world is explained from man, not man from the universal laws of nature. In the order of natural events, then, there is presupposed throughout that antithesis of thoughts and acts, of plan and material execution, which we find in our own consciousness. Everywhere we have an anthropomorphic activity. A plan, a purpose must first be provided, and then the matter and the force to set it going. We see here how much of a Sokratic Aristotle still was at bottom with his antithesis of form and matter, and the government of efficient causes by the final purpose. Without having dealt himself with physical science, Sokrates had yet already marked out

[46] Lewes, Hist. of Phil., i. 81 foll., gives this passage of the *Phaedo* (comp. Note 39) at length. He rightly thinks it to be genuinely Sokratic, and shows how Anaxagoras was misunderstood by Sokrates.

for it the path in which it was afterwards to travel with such steady persistence. But the peculiar principle of this theory of the universe is the theological. The architect of the worlds must be a Person who can be conceived and imagined by man, though he may not be understood in all his actions. Even the apparently impersonal expression that 'reason' has done all this receives a religious stamp through the unconditional anthropomorphism with which the work of this 'reason' is regarded. And therefore we find, even in the Platonic Sokrates—and this trait must be genuine—the expressions 'Reason' and 'God' often employed as quite convertible terms.

That Sokrates in his conception of these things rests upon essentially monotheistic views need not surprise us, for it lay entirely in the time. It is true this monotheism was nowhere dogmatic; on the contrary, the plurality of the gods is expressly maintained, but the preponderance of the God who is regarded as creator and preserver of the world makes the others beings of a lower rank, who may, for many speculative purposes, be left entirely out of sight.

So that we may perhaps assume that the uncertainty of physical speculations, of which Sokrates complains, was nothing but the too obvious impossibility of constructing a complete and rational explanation of the whole structure of the universe, such as he had vainly sought from Anaxagoras. For efficient causes are regarded by Sokrates, wherever he deals with them, as something entirely indifferent and unimportant; which is quite intelligible if they are conceived not as universal laws of nature, but merely as the implements of a reason which personally thinks or creates. The more exalted or majestic this is conceived to be, so much the more indifferent and insignificant will the implement be considered; and so Sokrates can scarcely speak with sufficient contempt of 'the search after external causes.'

One sees from this how at bottom the doctrine of the identity of thought and existence has a theological root, since it supposes that the reason of a world-soul, or a God, and a reason, moreover, differing from the human reason only in degree, has so contrived and disposed everything that we can think it again, and, if we use our reason quite rightly, *must* think it again.

The religious tendency inaugurated by Sokrates may be compared with the Rationalism of modern times. Sokrates is perfectly ready to retain the ordinary forms of religious cultus, only he imparts to them everywhere a deeper meaning; thus, for example, when he demands that we shall not pray for particular blessings, but much rather require 'good' from the gods, since they know best what is good for us. This doctrine seems as harmless as it is reasonable, until we reflect how deeply in Hellenic faith prayer for particular blessings was bound up with the very existence of particular deities. The gods of the popular belief were thus made by Sokrates only the representatives of a purer creed. Unity of worship between the people and the educated was preserved, but by the aid of an interpretation of traditional creeds which we may well call rationalistic. That Sokrates praises the oracles is quite in harmony with this tendency, for why should not the deity, who has taken thought in the smallest details for the good of man, also hold intercourse with him and afford him counsel? And even in our modern civilisation, and in England also, although more especially in Germany, a very powerful tendency has arisen, which thought it its duty to spread purer forms of faith, exactly out of zeal for the restoration of religion and its influence, and the main impulse of which, with all its rationalism, was a *positive* one. Zeal against Materialism, and the anxious assertion of the ideal benefits of faith in God, freedom, and immortality, was nowhere greater than amongst men of this tendency. So Sokrates also, who is under the double sway of destructive culture and love for

the ideal content of faith, will, above all things, preserve the latter. The conservative element, which pervades his whole being, by no means prevents him from putting his hands to very radical changes, even in the sphere of politics, in order that the most essential and noble element of political existence, the living sense of community, may be permanently secured against the torrent of the predominant individualism.

Lewes, who gives us what is in many respects an admirable picture of Sokrates, would like to prove from his doctrine that virtue is knowledge, that philosophy, and not morality, was the special occupation of his life. This distinction leads to misconceptions. A mere 'moralist' Sokrates certainly was not, if by that we mean a man who, without regard to the deeper establishing of his doctrines, only attempts to make himself and others more moral. But yet his philosophy in its inmost essence was moral philosophy, and moral philosophy based upon a religious foundation. In this is the mainspring of all his activities, and the presupposition of the intelligibility and teachableness of morality is from the beginning implied in his peculiar religious standpoint. That he went further, and not only asserted the intelligibility of morality, but identified practical virtue with the theoretical comprehension of morality, is his personal conception of the relationship; and here also we may venture to trace religious influences.

The Delphic god, who was especially a god of moral elevation, called upon man, by the inscription on his temple, to 'Know himself.' This utterance became to Sokrates in a twofold respect the guide of his philosophical career: first, in the establishment of moral science instead of the apparently fruitless natural science; but, secondly, in the principle of striving after moral elevation by means of knowledge.

The relativity of the Sophists must to a man of this intellectual tendency have been thoroughly hateful. The religious sense calls for its sure points, especially in all

that concerns God, the soul, and the rule of life. For Sokrates, therefore, it is an axiomatic principle that there must be an ethical knowledge. Relativity, which scouts it, rests upon the right of individual impressions. As against this, then, the universal and the universally true must be established.

We have seen above how the step to the universal might have been taken from the standpoint of relativity without any change of principle. But in that case the universal would have been conceived in a strict Nominalistic sense. Knowledge might have extended itself to infinity on this field without ever getting beyond empiricism and probability. It is interesting to observe how the Platonic Sokrates, in arguing against the relativity of Protagoras, often begins exactly as a genuine disciple of the Sophists must have begun, if he would venture on the step to the consideration of the universal. But the controversy never stops there; it always aims beyond the immediate goal, in order to embrace the universal in that transcendental sense in which Plato had introduced it into science. And the ground had, without doubt, been already prepared for this by Sokrates. If the Platonic Sokrates proves, for example (in the Kratylus), that names are not arbitrarily assigned to things, but that they correspond to the innermost nature of the object, there is already contained in this nature of things, in a germinal shape, that essence which Plato later exalted so high above the individual things, that they were reduced and degraded to mere appearances.

Aristotle attributes to Sokrates two essential innovations in method—the use of *definitions* and *induction*. Both, as methods of dialectic, turn upon universals; and the art of discussion, in which Sokrates was a master, consisted chiefly in the sure and skilful reference of the single case to a universal, and employment of the universal to conclude back to the particular. And it is just here, of course, that we find in the Platonic dialogues quantities

of logical tricks, ambuscades, and sophisms of all kinds on the side of the always victorious Sokrates. He plays often with his opponents, as a cat with a mouse, entraps them into far-reaching admissions, only to show them himself immediately that the reasoning contained an error; but scarcely is this repaired, than the opponent is again caught in a snare, which is, in fact, no more real than the first.

There is no doubt that here the general treatment is genuinely Sokratic, although the particular arguments are for the most part Plato's. It will also be admitted that this sophistical manner of opposing the Sophists is much more profitable in speech, in the direct conflict of argument, where one man tries his intellectual strength against another, than in the calm literary discussion which, at least according to our ideas, must be measured by a far severer standard of soundness in its proofs.

Sokrates scarcely ever consciously confused his opponents, and merely overmatched them instead of thoroughly refuting them. It is his firm belief in his own principles that blinds him to the errors of his own reasoning, while he instantly discovers those of his opponents, and employs them with all the force of a practised athlete. Although, however, we cannot charge Sokrates with any dishonesty in debate, yet the confusion of the defeat of an opponent with the refutation of his opinion belongs to him also, as it had already belonged to his predecessors and to Greek dialectic from its first beginnings. The picture of the intellectual wrestling-match, or, as we find in Aristotle in particular, of the contest of two parties before a tribunal, is everywhere present, the thought appears linked with the person, and the vivid picturesqueness of debate replaces a calm and complete analysis.

The Sokratic 'irony,' moreover, with which he professes ignorance and asks instruction from his opponent, is often only the thin veil of a dogmatism which is ever ready, in the least embarrassment, innocently, and to all appearance only tentatively, to foist in a ready-made opinion, and,

unobserved, to gain it acceptance. Yet this is a dogmatism which consisted in the constant repetition of few and simple dogmas: virtue is knowledge; the just man alone is really happy; self-knowledge is the first duty of man; to improve himself is of more consequence than any care for external things, and so on.

With regard to the special meaning of self-knowledge and the doctrine of virtue, Sokrates remains always a seeker only. He seeks with all the energy of a believing nature, but he does not venture to assert definite conclusions. His method of definitions leads much more frequently to the mere postulation of a definition, to the statement of the idea of the thing that is to be known, than to the actual establishing of a definition. When we reach the point where something more should be given us, we find either a mere attempt or the everlasting Sokratic ignorance. He is apparently content with the negation of negation, and reminds us of the oracle which declared him to be the wisest of the Greeks because he knew his own ignorance, whilst other men do not so much as know that they know nothing. This result, however, purely negative as it appears, is far as the heavens removed from scepticism; for whilst the sceptic denies the very possibility of certain knowledge, to Sokrates the idea that such a knowledge there must be is the very guiding star of all his activity. He contents himself, however, with making room for genuine knowledge by destroying mere sham knowledge, and by the constitution and employment of a method which shall be capable of discerning true from seeming knowledge. Criticism therefore, as opposed to scepticism, is the function of this method; and in the vindication of criticism as the instrument of science we have at least one achievement of his activity that possesses a permanent value. And yet his chief significance in the history of philosophy does not lie here, but in his belief in knowledge and its object; the universal essence of things, the stationary pole in the flight of phenomena. Although this

belief may have overshot the mark, yet thus was taken the indispensable step that the flagging energies of Relativism and Materialism were incapable of taking—the treatment of the universal in its relation to the individual, of conceptions in contrast to mere perception. The tares of Platonic Idealism grew up together with the wheat; but the ground was yet again prepared: when a strong hand took the plough, the field of philosophy again bore fruit a hundredfold, just when it seemed destined to be unproductive.

Of all the disciples of Sokrates, Plato was the one most deeply affected by that religious glow which proceeded from him, and it was Plato also who carried out most purely, though also most one-sidedly, the thoughts of the master. And it is especially the errors which lie at the foundation of the Sokratic philosophy which, in the hands of Plato, attain a mighty development, to endure for thousands of years. These Platonic errors, however, because of their deep opposition to the philosophy which springs from experience, are for us of especial importance. They are also errors of universal significance, like those of Materialism; for although they may not be connected with the nature of our thinking faculties by such immediate points of connection as is Materialism, yet they rest only the more surely on the broad basis of our whole psychical organisation. Both theories are necessary stages of human thought, and although Materialism may, as compared with Platonism, upon special points always maintain its position; yet it may be that the whole picture of the world which this latter affords stands nearer to the unknown truth: in any case it has deeper relations to the life of the emotions, to art, to the moral functions of mankind. Noble, however, as these relations may be, and beneficently as Platonism at various epochs may have acted through them on the whole development of humanity, the indispensable duty nevertheless remains of laying thoroughly bare the errors of Platonism without regard to their nobler aspects.

But first a word as to Plato's general tendency. We called him the purest of the Sokratics, and we found in Sokrates a Rationalist. This is far from agreeing with the widely current view which regards Plato as a mystic and a poetical enthusiast; but this view is thoroughly false. Lewes, who has opposed this notion with special energy, thus characterises him: "He wrote poetry in his youth; in mature age he wrote vehemently against it. In his dialogues he appears anything but 'dreamy;' anything but 'an Idealist,' as that phrase is popularly understood. He is a dialectician, a severe and abstract thinker, and a great Sophist. His metaphysics are of a nature so abstract and so subtle that they frighten away all but the most determined students. His views on morals and politics, so far from having any romantic tinge, are the *ne plus ultra* of logical severity; hard, uncompromising, and above humanity. He had learned to look upon human passion as a disease, and human pleasure as a frivolity. The only thing worth living for was truth. Dialectics was the noblest exercise of humanity." [47]

[47] Lewes, Hist. of Phil., i. 197. Compare, on the other hand, the approving words of Zeller, ii. (2te Aufl.), p. 355, as to the poetical character of the Platonic philosophy: "As an artistic nature was necessary to the production of such a philosophy, so in turn this philosophy would necessarily require to be embodied in artistic shape. The phenomenon brought into such near contact with the idea as we find with Plato becomes a beautiful phenomenon, the intuition of the idea in the phenomenon an æsthetic intuition. Where science and life so interpenetrate each other as with him, there science will only be communicated in lively description; and since what is to be communicated is an ideal, this description will necessarily be a poetical description." No doubt Lewes has under-estimated the artistic element in Plato's dialogues. Both descriptions are just, and not irreconcilable; for the plastic beauty, clear as the god of light, of the form in Plato, is indeed 'poetical,' in the wider sense of the word, but is not mystical or romantic. At the same time, however, the stubborn and pretentious dialectic, to which Lewes holds, is carried to an extent which is in fact not only extravagant, but is even disturbing to the artistic form; but it stands, moreover, with its dogmatism and its special pretentions to a 'knowledge' which is only gained by a systematic struggle, also in contradiction with the genuine poetical principle of true speculation, which relies more upon intellectual vision than upon mediate knowledge. Plato's philosophy might indeed, if this artistic element had been carried out, have become the best model for the speculation of all time; but the

In all this, it cannot be denied that, historically, Platonism frequently appears in connection with enthusiasm, and that even the widely-digressing Neoplatonic systems find some support in Plato's doctrine; nay, amongst the immediate followers of the great master there were those who may be described as mystics; and the Pythagorean elements which they combined with the teachings of Plato find in these very teachings support and authority. We have besides these, of course, the extremely sober 'middle academy,' which also connected itself with Plato, and the beginnings of whose theory of probability may in fact be traced in Plato.

The truth is, that in Plato the Sokratic Rationalism outruns itself, and in the effort to elevate the sphere of reason high above the sensations, went so far that a relapse into mythical forms became inevitable. Plato ascended into a sphere for which man has been granted neither language nor powers of conception. He saw himself thus compelled to fall back upon figurative expression; but his system is a speaking proof that figurative expression for what is entirely supersensual is a chimera, and that the attempt to climb by this ladder to impossible heights of abstraction revenges itself in the predominance exercised by the figure over the thought, and by rushing to consequences in which all logical consistency perishes beneath the glamour of associations of sensuous ideas.[48]

combination of this element with the abstract dialectic, and logical severity, so sharply emphasised by Lewes, produces a heterogeneous whole, and especially by its total confusion of science and poetry created great confusion in later philosophy.

[48] Zeller, ii. 2 Aufl., p. 361 ff. [E. T. 160 foll.]. recognises, quite rightly, that the Platonic myths are not the mere garments of thoughts which the philosopher possessed in another shape, but that they are employed in those cases where Plato wishes to express something which he has no means of conveying in rigorous scientific form. It is wrong, however, to regard this as a weakness in the philosopher, who is here merely too much of a poet still, and too little of a philosopher. It lies rather in the nature of the problems on which Plato has here ventured that they cannot be treated in any but a figurative method. An adequate scientific knowledge of the absolutely transcendental is impossible, and modern systems which calls up the phantom of an intellectual knowledge of transcendental things, are in truth no whit higher in this respect than the Platonic.

Plato, before attaching himself to Sokrates, had been introduced to the philosophy of Herakleitos, and had so learnt that there is no quiet persistent being, that everything is in constant flux. When, then, he thought he had discovered something permanent in the Sokratic definitions, and in the universal essence of things which is expressed in these definitions, he combined this doctrine with a Herakleitean element, in such fashion that he attributed true being, and the undisturbed permanence inseparable from it, to the universal alone; the individual things, on the other hand, *are* strictly not at all, but merely *become*. The phenomena flow away without reality: being is eternal.

We now know that the only ideas capable of definition are abstract, self-constituted ideas, such as those employed by the mathematician in order to approach infinitesimally near to the quantitative constitution of things, without, however, exhausting it by his formulas. Every attempt to define *things* breaks down: the conventional employment of a word may be arbitrarily fixed, but when this word is used to indicate a class of objects according to their common nature, it becomes evident, sooner or later, that the things have other relations and other distinguishing qualities than was originally supposed. The old definition becomes useless, and must be replaced by a new, which has in its turn no more pretensions to eternal validity than the first. No definition of a fixed star can prevent it from moving; no definition can draw a permanent boundary between meteors and other heavenly bodies. As often as research makes a great step forward, the definitions must give way, and individual things do not regulate themselves in accordance with our general notions, but these must, on the contrary, be determined by the particular objects which we perceive.

Plato carried further the elements of logic he had received from Sokrates. In him we find, for the first time, a clear idea of *genera* and *species*, of the co-ordination and

subordination of concepts; and he is fond of using the new achievement that he may, by the aid of division, bring light and order into the objects of discussion. This was, indeed, a great and important step forward, and yet even this immediately enlisted itself in the service of as great an error. There arose that hierarchy of ideas in which that which is most void of content was placed highest. Abstraction was the Jacob's ladder by which the philosopher ascended to certainty. The further he was from facts, the nearer he thought himself to truth.

Whilst Plato, however, exhibited universal ideas as the permanent in the fleeting phenomenal world, he saw himself further compelled to the pregnant step of separating the universal from the particular, and attributing to it a separate existence. Beauty is not only in beautiful objects, goodness not only in good men, but the beautiful, the good, quite abstractly regarded, are self-existent realities. It would lead us too far to discuss fully here the Platonic ideal theory: it is enough for our purpose to examine its foundations, and to see how from these foundations sprang that intellectual tendency which raised itself so high, as it supposed, above the vulgar empiricism, and which must, nevertheless, at all points, yield again to empiricism wherever it is a question of the positive progress of science.

So much is clear, that we need the universal and the process of abstraction in order to attain to knowledge. Even the particular fact, in order to become an object of knowledge, must be exalted above the Individualism of Protagoras by the supposition and demonstration of a perception of something implying regular recurrence; that is, of the universal as against the individual—of the average as against fluctuations. But knowledge thus begins at once to rise above mere opinion before it has directed itself to any special class of similar objects. We require, however, in addition, even before we can accurately know whole classes, general terms in order to fix our knowledge, and

to be able to communicate it; for the simple reason that no language could suffice to express all particulars, and because, with a language that did this, no understanding, no general knowledge would be possible, and the retention of such an infinity of meanings would be impossible. On this point Locke was the first to throw a clear light; but we must never forget that Locke, long as he lived after Plato, nevertheless stands in the midst of the great process by which the modern world freed itself from the Platonic and Aristotelian theory of things. Sokrates, Plato, and Aristotle, like their whole age, allowed themselves to be deceived by words. We have seen how Sokrates believed that every word must originally express the essence of the thing; the general name, therefore, would express the nature of the class of objects in question. Where there was a name, there a real existence was presupposed. Justice, Truth, Beauty, must mean 'something;' and there must accordingly be realities corresponding to these expressions.

Aristotle points out that Plato first distinguished the universal essence of things from the individuals, which Sokrates had not yet done. But Sokrates had, moreover, not held that peculiar doctrine of Aristotle as to the relation of the universal to the particular which we shall soon have to consider. Yet Sokrates had got as far as the theory that our knowledge has reference to the universal, and that is something quite different from the indispensableness of general notions for knowledge explained above. The virtuous man is, according to Sokrates, the man who knows what is pious or impious, what is noble or disgraceful, what is just or unjust; but in saying this, he had always in his eye the definition which he was ceaselessly in search of. The universal nature of the just, of the noble, not what is in the particular case just and noble, is sought. From the universal we must obtain the particular, but not conversely; for induction serves him in reaching the universal, only to make it clear to the mind,

not to found the universal upon the sum of particular instances. From this standpoint it was only consistent to allow the universal to exist by itself, because only thereby did it seem to attain to complete independence. Only later could the attempt be made to establish for the universal an immanent and yet fundamentally independent relation to the particular objects. It must not be left out of sight, however, that the Herakleitean foundation of Plato's education very materially contributed to bring about this separation between the universal and the particular.

But we must not fail to understand that from this paradoxical method of working of course only paradoxical results could follow. The name is made a thing, but a thing having no similarity with any other thing, and to which, in the nature of human thought, only negative predicates can be attached. But since there is an absolute necessity for some positive assertion, we find ourselves from the outset in the region of myth and symbol.

The very word *εἶδος* or *ἰδέα*, from which our word idea has come, bears this stamp of the symbolical. There is a similar notion of the species as distinguished from the individual. We may very easily represent to ourselves in imagination a pattern of any species which is free from all the accidents of the individual, and will therefore stand for the type or pattern of all individuals, and be moreover an absolutely perfect individual. We cannot imagine a lion as such, a rose as such; but we may represent in imagination a definitely-outlined picture of a lion or a rose, wholly free from all those accidents of individual formation which may collectively be regarded as deviations from this norm, as imperfections. This is, however, not the Platonic idea of the lion or the rose, but an ideal that is a creation of the senses, intended to express the abstract idea as perfectly as possible. The idea itself is invisible, for everything that is invisible belongs to the fleeting world of mere phenomena: it has no forms in

space, for the supersensuous cannot be linked with space. Similarly nothing whatever positive can be expressed of the ideas without conceiving them in some sensuous fashion. They cannot be called pure, sovereign, perfect, eternal, without our connecting with them by these very words ideas of sense. So Plato, in his ideal theory, is obliged to have recourse to mythus, and so, at a single step we pass from the highest abstraction to the true life-element of all mysticism—the sensuous supersensuous. The mythus is, however, to have only a figurative or metaphorical force. By its means, what is in itself only an object of the pure reason is to be represented in the forms of the phenomenal world; but what kind of *figure* can that be of which the original cannot be supplied?

The idea itself is said to be perceived by the reason, though but imperfectly in this earthly life, and the reason stands related to this supersensuous existence as the senses are related to sensible objects. And this is the origin of that sharp separation of reason and sensation which has ever since dominated all philosophy, and has excited endless misunderstandings. The senses are said to have no share in knowledge; they can only feel or perceive, and reach only to phenomena. The reason, on the other hand, is capable of comprehending the supersensual. It is completely separated from the rest of the human organisation, especially by Aristotle, who has developed this doctrine further. Certain special objects are supposed to be known by the pure reason—the 'Noumena' which, in opposition to 'Phenomena' or appearances, form the object of the highest kind of knowledge. But, in fact, not only are these noumena cobwebs of the brain, but even the 'pure reason,' which is to apprehend them, is equally fabulous. Man has no such reason, and no idea of such a reason, which can perceive the universal, the abstract, the supersensuous, the ideas without the mediation of sensation and perception. Even where our thought carries us beyond the limits of our sensible ex-

perience, where we are led to the conjecture that our space, with its three dimensions, our time, with its present springing out of nothing and vanishing into nothing, are only human forms of the conception of an infinitely more comprehensive being,—even here we must avail ourselves of the ordinary understanding, whose categories, one and all, are indissolubly connected with sensation. We cannot imagine either the one and the many, or substance as opposed to its qualities, or even a predicate of any kind, without an infusion of the sensible.

We are here, therefore, everywhere in the presence of mythus, and of mythus whose inner core and significance consists of the utterly unknown, not to say an absolute nonentity. All these Platonic conceptions, therefore, have been, down to our own days, only hindrances and *ignes fatui* for thought and inquiry, for the mastery of phenomena by the understanding and by sure methodical science. But just as the human spirit will never be content with the world of understanding, which an exact empiricism might afford us, so the Platonic philosophy will ever remain the first and most elevated type of a poetical exaltation of the spirit above the unsatisfying patchwork of knowledge, and we are as much justified in this exaltation on the wings of imaginative speculation as in the exercise of any function of our mental and physical faculties. Nay, we shall attach to it a high importance when we see how the free play of spirit which is involved in the search after the One and the Eternal in the change of earthly things, reacts with a vitalising and freshening influence upon whole generations, and often indirectly affords a new impulse even to scientific research. Only the world must, once for all, clearly comprehend that we have here not knowledge, but poesy, even though this poesy may perhaps symbolically represent to us a real and true aspect of the true nature of all things, of which the immediate apprehension is denied to our reason. Sokrates wished to make an end of the rampant individualism, and to pave the way to objective

knowledge. The result was a method which completely confused subjective and objective, rendered impossible the direct advance of positive knowledge, and appeared to open to individual thought and speculation a sphere of the most unlimited license. But this license was, nevertheless, not really so unlimited. The religious and moral principle from which Plato and Sokrates started guided the great speculative movement to a determined goal and made it capable of affording a deep content and a noble character of completeness to the moral efforts and struggle of thousands of years, while it became completely fused with foreign and anything but Hellenic conceptions and doctrines. And even to-day the ideal theory, which we are obliged to banish from the realm of science, may by its ethical and æsthetic content become a source of plentiful blessings. The 'form' (*Gestalt*), as Schiller has so beautifully and vigorously rendered the faded expression 'idea,' still lives and moves divinely amongst gods in the abodes of light, and still to-day, as in old Hellas, has the power of lifting us upon its wings above the anxieties of earth that we may flee into the realm of the ideal.

As to Aristotle, we shall here speak very briefly, since we must discuss the influence of his system when we come to medieval times. Then we will enter more fully into the most important notions which the middle ages and modern times have, with various modifications, borrowed from his system. Here we are rather concerned with its general nature and its relation to Idealism and Materialism.

Aristotle and Plato being by far the most influential and important of the Greek philosophers whose works we possess, we are easily led to suppose a sharp antithesis between them, as though they represented two main philosophical tendencies — *a priori* speculation and rational empiricism. The truth is, however, that Aristotle devised a system in close dependence upon Plato, which, though not without internal inconsistencies, combines an apparent

empiricism with all those errors which in the Sokratico-Platonic theories radically corrupt empirical inquiry.[49]

It is still a very widely prevalent opinion that Aristotle was a great physical inquirer. But since we have known how much had been previously accomplished in this sphere,[50] and how unhesitatingly Aristotle appropriated the observations of others, and all kinds of information, without mentioning his authority; moreover, how many of his statements bear an impression of being his own observations which cannot have been observed, because they are wholly false;[51] criticism of this opinion has

[49] The proofs of this we will take from a book recently published, although not written with this object: Eucken, Die Methode der aristotelischen Forschung in ihrem Zusammenhang mit den philosophischen Grundprincipien des Aristoteles: Berlin, 1872. In this very careful and learned little book is a striking support of the view, which we have long held, that the neo-Aristotelian school, which was founded by Trendelenburg, must in the end chiefly contribute to our definitive emancipation from Aristotle. In Eucken philosophy resolves itself into the Aristotelian philology; but then this philology is thorough and objective. We nowhere find the deficiencies of the Aristotelian method so clearly and comprehensively stated as here; and although the author, nevertheless, holds that there is a balance of advantages, yet no careful reader can help seeing how weak the proofs of this are. The small success of Aristotle in scientific discoveries is attributed by the writer almost exclusively to the want of instruments necessary to perfect the powers of observation, although it is historically established that modern progress in all the departments of natural inquiry began with almost the same means which were at the service of the ancients, and that it has for the most part created for itself the magnificent tools which are to-day at its disposal. Copernicus had no telescope, but he dared to shake off the authority of Aristotle. That was the decisive step, and it was the same in all other departments.

[50] This point has, of course, escaped Eucken, who (Meth. d. arist. Forschung, S. 153), on the contrary, makes it appear how little had been done before him. Yes, if the *extant* literature were all! Comp. on the other side the Noté 11 above on the use made of Demokritos, and the manner in which Aristotle, as described by Eucken, S. 7 foll., made use of his predecessors without quoting them—unless they were to be introduced for the purpose of being refuted.

[51] Examples in Eucken, S. 154 ff.: that men only have palpitation of the heart; that male creatures have more teeth than females; that the skull in woman has, unlike that of man, a circular suture; that there is an empty space in the back part of the human skull; and that men have eight ribs. Again, S. 164 foll., what are said to be experiments: that eggs float in strong brine; that it is possible to collect in a close vessel or wax drinkable water from the sea; that the yolk of several eggs shaken together collects into the middle.

been excited, although it has scarcely as yet thoroughly gone to work. But what must in any case remain to Aristotle is the praise, bestowed on him by Hegel, of having subordinated the wealth and the detail of the actual universe to the Notion. However great or however small may have been his independent work in the special sciences, the most important element of his whole activity will still be the collection of the matter of all existing sciences around speculative points of view, and therefore an activity which in principle coincides with that of the modern systematisers, and above all of Hegel.

Demokritos also mastered the whole extent of the science of his time, and that probably with greater independence and thoroughness than was the case with Aristotle; but we have no trace whatever of his having brought all these sciences under the yoke of his system. With Aristotle the carrying out of the speculative basis is the chief aim. The one and the permanent, which Plato sought outside things, Aristotle wants to find in the manifoldness of the things themselves. As he makes the external universe an enclosed sphere, with the earth resting in the centre, so the world of science is pervaded by the same method, the same manner of conception and representation, and everything gathers round the knowing subject, whose ideas, with a naive forgetfulness of all the limitations of knowledge, are viewed as the true and ultimate objects of apprehension.

Bacon advanced the assertion that the co-ordination of knowledge into a system was a hindrance to further progress. This view Aristotle could scarcely have opposed, for he held the task of science as a whole to be exhausted, and never for a moment doubted that he was in a position to supply a satisfactory answer to all really essential questions. As in the sphere of ethic and politic he confined himself to the types exhibited in the Hellenic world, and had little sense of the great changes which were going on beneath his eyes, so he troubled himself little with the

crowd of new facts and observations which were made accessible to the man of science by the campaigns of Alexander. That he accompanied Alexander in order to satisfy his desire of knowledge, or that plants and animals were sent to him for examination from distant climates, is mere fable. Aristotle confined himself in his system to the knowledge of his own day, and was convinced that this was all that was of real importance, and sufficed to solve all the principal problems.[52] It was this very limitation of his views, and the certainty with which he moved in the narrow circle of his universe, that recommended Aristotle so eminently to the philosophical teachers of the Middle Ages, while modern times, with their inclination to progress and revolution, had no task more important than to burst asunder the fetters of this system.

More conservative than Plato and Sokrates, Aristotle everywhere attaches himself to tradition, to popular opinion, to the conceptions contained in language; and his ethical advances keep as near as possible to the ordinary customs and laws of Hellenic communities. He has therefore always been the favourite philosopher of conservative schools and tendencies.

The unity of his theory of things Aristotle secures by the most reckless anthropomorphism. The corrupt teleology which argues from man and his aims is one of the most essential elements of his system. As in human production and activity, for example in the building of a house or ship, the idea of the whole is always the first thing present as the end of activity, and as this idea then, by the carrying out of the parts, realises itself in matter, nature must be supposed to proceed in the same way,

[52] Cuvier observed that Aristotle describes the Egyptian fauna not from his personal observation, but from the details furnished by Herodotus, although the description reads as if he had himself seen the animals. Humboldt remarks that the zoological writings of Aristotle exhibit no trace of any addition to knowledge made by the campaigns of Alexander. (Eucken, *loc. cit.* p. 16 and p. 160; as to his view of the completion of scientific knowledge, p. 5 foll.)

because in his view this sequence of end and thing, of form and matter, is typical of all that exists. After man with his aims, the world of organisms is established. These serve him not only to show the real potentiality of the tree in the seed-corn, not only as types for the classification by species and genus, as model examples of the teleological principle, and so on, but especially, by the comparison of lower and higher organisms, to establish the view that everything in the universe is capable of being arranged in degrees of rank, and according to notions of value—a principle which Aristotle does not fail to go on to apply to the most abstract relations, such as above and below, right and left, and so on. And he obviously believes that all these relations of rank do not merely exist in the human method of comprehension, but are grounded upon the nature of things. So everywhere the universal is explained by means of the special, the easy by means of the difficult, the simple by the compound, the low by the higher. And this it is which in great measure has secured the popularity of the Aristotelian system; for man, to whom nothing is of course more familiar than the subjective circumstances of his thought and action, is always inclined to regard as clear and simple their causal relations to the world of objects, since he confounds the obvious succession in time of the internal and external with the mysterious motive power of efficient causes. Thus, for example, Sokrates could regard as a very simple matter the 'thinking and electing' by which human actions come about according to the notion of the end; the result of a determination seemed no less simple, and the precedent circumstances in muscles and nerves become merely indifferent accidents. Things in nature seem to betray a certain designedness, and therefore they also must arise by this so natural process of thought and election. A Creator constituted like man is therefore assumed; and as he is infinitely wise, the whole way of looking at things is rested upon a firm basis of optimism.

Aristotle had, of course, made a great advance in the method in which he conceives the end as operative in things. (Comp. note 40.) When man came to reflect more closely on the way and manner in which the end was realised, that most naive anthropomorphism which made the Creator work with human hands was no longer to be entertained. A rationalistic view of things, which regarded the popular religious ideas as the figurative presentation of supernatural facts, could, of course, make no exception in the case of teleology; and as here also, as everywhere, Aristotle endeavoured, after his manner, to attain to complete clearness, he was necessarily led by teleology itself, and by the consideration of the organic world, to a pantheistic theory, which makes the divine thought everywhere permeate matter, and realise itself and become immanent in the growth and becoming of all things. By the side of this view, which was capable, with very slight modification, of being developed into a complete Naturalism, there is in Aristotle a transcendental idea of God, which theoretically rests upon the truly Aristotelian thought that all motion must ultimately proceed from a something itself unmoved.[53]

The traces of empiricism in Aristotle are to be found partly in isolated expressions, of which the most important are those which require us to respect facts, but partly also in his doctrine of substance (*οὐσία*), which, of course,

[53] The principle of the Aristotelian theology is very well and very succinctly expressed in Ueberweg, Grundriss, i. 4 Aufl. p. 175 foll., 1 E. T. 162, 163: "The world has its principle in God, and this principle exists not merely as a form immanent in the world, like the order in an army, but also as an absolute self-existent substance, like the general in an army." The conclusion of the theology with the words of Homer, *οὐκ ἀγαθὸν πολυκοιρανίη, εἷς κοίρανος ἔστω*, betrays the ethical tendency at its foundation; but the ontological support of the transcendentality of God lies in the proposition that all motion, including the development from potentiality to reality, has a moving cause which is itself unmoved. "Every particular object which is the result of development implies an actual moving cause; so the world, as a whole, demands an absolutely first mover to give form to the naturally passive matter which constitutes it" (*loc. cit.* 162).

offends us by an irreconcilable contradiction. Aristotle, in this point differing essentially from Plato, calls, in the strict and proper sense, the individual existences and things substances. In them the form, the essential part, is united with matter; the whole is a concrete and thoroughly real existence. Nay, Aristotle sometimes speaks as though complete reality belonged properly to the concrete thing alone. This is the standpoint of the medieval Nominalists, who, however, have not, as a matter of fact, the opinion of Aristotle thoroughly on their side; for Aristotle spoils everything again by admitting a second kind of substance, especially in the notions of species, but also in universals generally. Not only is this apple-tree here before my window a reality, but the notion of kind also indicates a similar reality; only that the universal essence of the apple-tree does not dwell in the vague cloud-land of ideas, from which it radiates an influence into the things of the phenomenal world, but the universal essence of the apple-tree has its existence in the individual apple-trees.

There is here, in fact, so long as we confine ourselves to organisms, and compare only species and individual, a deceptive appearance which has already dazzled many moderns. Let us endeavour to indicate precisely the point where truth and error separate.

Let us begin by placing ourselves at the Nominalistic standpoint, which is perfectly clear. There are only individual apple-trees, individual lions, individual maybugs, and so on; and besides these names, by which we colligate the sum of existing objects, where similarity or likeness connects them together. The 'universal' is nothing but the name. It is not difficult, however, to give this way of looking at things an appearance of superficiality, by pointing out that we are here treating not of casual similarities, depending on the casual perception of the subject, but that objective nature offers certain obviously distinctive groups which, by their real similitude, compel us to this

common conception of them. The most unlike individuals amongst lions or maybugs are yet much nearer to each other than the lion is to the tiger, or the maybugs to the stag-beetle. This observation is doubtless true. Yet a very brief examination of its force will show us that the real connecting link, which we will for brevity's sake admit without discussion, is in any case something quite different from the universal type of the genus which we in our fancy associate with the name apple-tree.

We might, then, from this point carry much further the metaphysical discussion of the relation of the individual to the universal, of the one to the many. Supposing that we knew a formula of the combination of matter, or of the state of things in a germ-cell, by which it could be determined whether the germ *will* develop itself into the form of an apple or of a pear tree; then it may be conjectured that every individual germ-cell, besides the conditions of this formula, has also its individual variations and peculiarities, and really is at bottom in all cases, at first, the result of the universal and particular, or rather the concrete fact, in which there is no distinction whatever of the universal and the particular. The formula lies purely in our mind.

We easily see that here again realistic objections might be made; but it is not necessary to follow this chain further in order to understand the error of the Aristotelian doctrine of the universal. This error lies much further back; for Aristotle keeps close by the word. He seeks nothing unknown behind the universal essence of the apple-tree. This is much rather fully known. The word directly indicates a reality, and this goes so far that Aristotle, in the transference of that which was found in the organism to other objects, in the case of a hatchet distinguishes the individuality of this particular hatchet from its 'hatchetness.' The 'hatchetness' and the material, the metal, taken together, compose the hatchet, and no bit of metal can become a hatchet until it is seized and possessed

by the form corresponding to the universal. This tendency to infer the existence immediately from the name is the fundamental error of the Aristotelian theory of notions, and leads, in its logical consequences, little as Aristotle cares to trouble himself with these, to the same exaltation of the universal over the particular which we find in Plato. For if it is once conceded that the essence of the individual lies in the species, the most essential part of the species must again lie on a still higher plane, or, in other words, the ground of the species must lie in the genus, and so on.

As a matter of fact, then, this thoroughgoing influence of the Platonic modes of thought is clearly shown in the method of inquiry usually employed by Aristotle. For we speedily discover that his proceeding from facts, and his inductive mounting from facts to principles, has remained a mere theory, scarcely anywhere put in practice by Aristotle himself. At the most, what he does is to adduce a few isolated facts, and immediately spring from these to the most universal principles, to which he thenceforward dogmatically adheres in purely deductive treatment.[54] So Aristotle demonstrates from universal principles that outside our enclosed world-sphere nothing can exist; and in the same manner he reaches his destructive doctrine of the 'natural' motion of bodies in opposition to the 'enforced' motion, to the assertion that the left side of the body is

[54] Eucken, *loc. cit.*, S. 167 sqq., shows that even the strict notion of induction in Aristotle is not easy to fix, because he often uses the expression for mere analogy, which must, however, differ from induction; and even for the mere explanation of abstract ideas by instances. Where the term is used more strictly (for the reaching of the universal out of the particular), Aristotle was still inclined (*loc. cit.*, S. 171) to pass hastily from the particular to the universal. "So hat er denn in den verschiedenen Gebieten der Naturwissenschaft im Allgemeinen wie im Besondern manchmal mit grosser Zuversicht von einigen wenigen Erscheinungen aus auf das Allgemeine geschlossen und daher oft Behauptungen aufgestellt, die weit über den Umfang des von ihm thatsächlich Beobachteten hinausgehen." Examples of this, S. 171 ff., as to *a priori* conclusions, where induction should rather have been employed, comp. Eucken, SS. 54 ff., 91 ff., 113 ff., 117 ff., &c.

colder than the right, to the doctrine of the transformation of one kind of matter into another, of the impossibility of motion in empty space, to the absolute distinction of cold and warm, light and heavy, and so on. So again he proves *a priori* how many species of animals there can be, demonstrates from universal principles why animals must be endowed with this member or that, and numerous other propositions, which are then employed in their turn, with the most logical consistency, and which in their totality render successful inquiry completely impossible. The science to which the Platonic and Aristotelian philosophy best adapts itself is naturally mathematics, in which the deductive principle has attained such brilliant results. Aristotle, therefore, views mathematics as the type of all sciences, only he prevents its employment in natural researches by everywhere referring the quantitative back to the qualitative; and so adopts a precisely opposite course to that taken by modern physical science.

Closely connected with deduction is the dialectical treatment of controverted points. Aristotle is fond of a historico-critical exposition of the views of his predecessors. They are to him the representatives of all possible opinions, to which he finally opposes his own particular view. Universal agreement is a complete proof; the refutation of all other views gives an appearance of necessity to what appears to be the one remaining view. Plato had already distinguished knowledge from correct opinion by the capacity of him who has a ready answer to all possible objections, and can maintain his own view successfully in the struggle of opinions. Aristotle himself introduces the opponents, makes them expound their opinions—often inaccurately enough—disputes with them on paper, and then sits as judge in his own cause. So victory in discussion takes the place of proof, the contest of opinions the place of analysis, and the whole remains a purely subjective treatment, out of which no true science can be developed.

If we now ask how it was possible that such a system could prove a barrier for hundreds of years, not only to Materialism, but to every empirical tendency, and how it is possible that the 'organic-world theory of Aristotle' is still to-day maintained by an influential school of philosophy to be the axiomatic impregnable basis of all true philosophy, we must, in the first place, not forget that speculation is in general fond of starting from the naive notions of the child and the charcoal-burner, and so of connecting together in the sphere of human thought the highest and the lowest, in the face of the relativistic mean. We have already seen how consistent Materialism is able, as no other system can, to bring order and relation into the sensible world, and how it is entitled, from this starting-point, to regard even man, with all his various activities, as a special case of the universal laws of nature; and yet, how between man as an object of empirical research, and man as he is in the immediate self-knowledge of the subject, there is fixed an eternal gulf. And hence the attempt is ever repeated to see whether, by starting from self-consciousness, we may attain a more satisfying philosophy; and so strong is the secret tendency of man in this direction, that this attempt will a hundred times be regarded as successful, in spite of the recognised failure of all previous efforts.

It will indeed be a most important step in philosophical progress if these efforts are finally abandoned; but that will never be the case unless the longing of the human reason for unity receive satisfaction in some other way. We are constituted not merely to know, but also to imagine and construct; and though with more or less mistrust of the definite validity of what the understanding and the senses have to offer us, yet mankind will ever hail with joy the man who understands how, by the force of genius, and by employing all the constructive impulses of his era, to create that unity in the world and in our intellectual life which is denied to our knowledge. This creation will, indeed, be

only the expression of the yearning of the age after unity and perfection; yet even this is no small thing, for the maintenance and nourishment of our intellectual life is as important as science itself, although not so lasting as this is: since the investigation of the details of positive knowledge, and of the relations which are the exclusive objects of our knowledge, is absolute, owing to its method, while the speculative apprehension of the absolute can only claim a relative importance as the expression of the views of an epoch.

Although, then, we must ever regard the Aristotelian system as an opposing hostile force in relation to the clear distinction of these spheres—although it is the standing type of a perverted method, the great example of all that is to be avoided, in its mingling and confusion of speculation and inquiry, and in its pretensions not merely to comprehend but to dominate positive knowledge—yet we must, on the other hand, recognise that this system is the most perfect example as yet afforded in history of the actual establishment of a theory of the universe which forms a united and self-included whole. If, therefore, it is my duty to lessen the reputation of Aristotle as an investigator, yet, nevertheless, the manner in which he united in himself, and collected into a harmonious system, the whole sum of the learning of his time, still remains a gigantic intellectual achievement, and, by the side of the perverseness which we have been obliged to point out, we find in every department plentiful work of penetrating acuteness. In addition to this, as the founder of logic, Aristotle deserves a place of high honour in philosophy, and if the complete fusion of his logic with his metaphysic, taken abstractly, lessens the value of this science, yet this very combination lends force and charm to the system. In an edifice so firmly built, the spirit could take rest, and find its support in the seething and impetuous time when the ruins of the ancient culture, with the enthralling ideas of a new religion, excited in the Western mind so great and troubled an excitement,

and a stormy endeavour after new forms. How content were our forefathers on their earth, resting in the bounded sphere of the eternally-revolving vault of heaven, and what agitation was excited by the keen current of air that burst in from infinity when Copernicus rent this curtain asunder!

But we are forgetting that we have not yet to set forth the importance of the Aristotelian system in medieval times. In Greece it was only very gradually that it acquired the predominance over all other systems, when, after the close of the classical period which precedes Aristotle, the rich blossoming of scientific activity which began after him, also declined, and the vacillating spirit grasped here also at the strongest prop that seemed to be offered. For a time the star of the Peripatetic School blazed brightly enough beside other stars, but the influence of Aristotle and his doctrine could not prevent the invasion of Materialistic views with exalted force soon after him, nor indeed prevent these from seeking to find points of connection even in his own peculiar system.

CHAPTER IV.

MATERIALISM IN GREECE AND ROME AFTER ARISTOTLE: EPIKUROS.

We have seen in the previous chapter how that progress by antitheses, which Hegel has made so important for the philosophical treatment of history, must always be based upon a general view of all the facts in the history of culture. A tendency, after spreading vigorously and completely permeating its whole epoch, begins to die out, and loses its hold upon new generations. Meanwhile fresh forces arise from other and hitherto invisibly-working currents of thought, and adapting themselves to the changed character of the nations and states, issue a new watchword. A generation exhausts itself in the production of ideas, like the soil which produces the same crop too long; and the richest harvest always springs from the fallow field.

Such an alternation of vigour and exhaustion meets us in the history of Greek Materialism. Materialistic modes of thought dominated the philosophy of the fifth century B.C., the age of Demokritos and Hippokrates. It was toward the end of this century that a spiritual movement was inaugurated by Sokrates, which, after undergoing various modifications in the systems of Plato and Aristotle, dominates the succeeding century.

But again from the school of Aristotle himself there proceeded men like Dikaearchos and Aristoxenos, who denied the substantiality of the soul. And finally there appeared the famous physicist Strato of Lampsakos, whose doctrine, so far as it can be made out from the scanty

traditions, is scarcely distinguishable from purely Materialistic views.

The *νοῦς* of Aristotle Strato regarded as consciousness based upon sensation.[55] He supposed the activity of the soul to consist in actual motion. All existence and life he referred to the natural forces inherent in matter.

And although we find that the whole of the third century is marked by a revival of Materialistic modes of thought, yet Strato's reform of the Peripatetic School does not on this head make good more than a position of compromise. The decisive impulse is given by the system and school of Epikuros; and even his great opponents, the Stoics, in the sphere of physics incline distinctly to Materialistic conceptions.

The historical circumstances which prepared the way for the new influence were the destruction of Greek freedom and the collapse of Hellenic life—that brief but unique flowering-time, at the conclusion of which arises the Athenian philosophy. Sokrates and Plato were Athenians, and men of that genuine Hellenic spirit which was

[55] As, generally speaking, the most familiar form of Materialism among the Greeks was the *anthropological*, so we observe that Aristotle's doctrine of the separable, divine, and yet individual, soul in man met with the strongest opposition amongst his successors in antiquity. Aristoxenos, the musician, compared the relation of the soul to the body to that of harmony to the strings by which it is produced. Dikaearchos, in place of the individual soul-substance, put a universal principle of life and sensation, which becomes only temporarily individualised in corporeal objects. (Ueberweg, Grund., i. 4 Aufl. S. 198, E. T., Hist. of Phil., i. p. 183). One of Aristotle's most important interpreters under the empire, Alexander of Aphrodisias, conceived the separable soul (the *νοῦς ποιητικός*) to be no portion of the man, but only as the divine essence which influences and develops the natural and inseparable human soul, and by which, in consequence, the process of thinking takes place. (Comp. Zeller, iii. 1, 2 Aufl. S. 712). Amongst the Arabian interpreters, Averroes in particular conceived the doctrine of the penetration of the divine soul into man quite pantheistically; while contrariwise the Christian philosophers of the Middle Ages carried further than Aristotle the individuality and separability of the reason, from which they got their immortal *anima rationalis* (apart, that is, from the strictly orthodox doctrine of the Church, which requires that the immortal soul should include not the reason alone, but the lower faculties), so that in this particular too the exact view of Aristotle was scarcely anywhere accepted.

beginning to disappear before their eyes. Aristotle, in point of time and character, stands on the threshold of the transition, but by his resting upon Plato and Sokrates he was closely connected with the preceding period. How intimate are the relations in Plato and Aristotle of ethic to the idea of the state! Yet the radical reforms of the Platonic state are, like the conservative discussions of the Aristotelian politic, devoted to an ideal which was to offer strong opposition to the rising flood of Individualism. But Individualism was of the essence of the time, and an entirely different stamp of men arises to take control of the thought of the age. Again, it is the outlying districts of the Greek world which produce most of the principal philosophers of the next epoch; but this time, it is true, not the old Hellenic colonies in Ionia and Magna Graecia, but chiefly districts where the Greek element had come in contact with the influences of foreign, and especially Oriental culture.[56] The love of positive scientific research became more pronounced again in this era, but the various departments of inquiry began to diverge. Although we never find in antiquity that keen enmity between natural science and philosophy which is so common at present, yet the great names in the two spheres cease to be the same. The connection of men of science with a school of philosophers became much freer; while the chiefs of the schools were no longer inquirers, but were above all things advocates and teachers of their system.

The practical standpoint which Sokrates had asserted in philosophy allied itself now with Individualism, only to become the more one-sided in consequence. For the supports which religion and public life had previously offered to the consciousness of the individual now completely gave way, and the isolated soul sought its only support in philosophy. So it came about that even the Materialism of this epoch, closely as it also, in the contemplation of nature, leaned upon Demokritos, issued chiefly in an ethical

[56] Comp. Zeller, iii. 1, 2 Aufl., p. 26, E. T. (Reichel, Stoics, &c.), p. 36.

aim—in the liberation of the spirit from doubt and anxiety, and the attaining of a calm and cheerful peacefulness of soul. Yet before we speak of Materialism in the narrower sense of the term (see Note 1), let us here interpose some observations on the 'Materialism of the Stoics.'

At the first glance we might suppose that there is no more consistent Materialism than that of the Stoics, who explain all reality to consist in bodies. God and the human soul, virtues and emotions, are *bodies*. There can be no flatter contradiction than that between Plato and the Stoics. He teaches that that man is just who participates in the idea of justice; while, according to the Stoics, he must have the substance of *justice* in his body.

This sounds Materialistic enough; and yet, at the same time, the distinctive feature of Materialism is here wanting —the purely material nature of matter; the origination of all phenomena, including those of adaptation and spirit, through movements of matter according to universal laws of motion.

The matter of the Stoics possesses the most various forces, and it is at bottom force that makes it what it is in each particular case. The force of all forces, however, is the deity which permeates and moves the whole universe with its influence. Thus deity and undetermined matter stand opposed to each other, as in the Aristotelian system the highest form, the highest energy, and the mere potentiality of becoming everything that form produces from it —that is, God and matter. The Stoics, indeed, have no transcendental God, and no soul absolutely independent of body; yet their matter is thoroughly pervaded, and not merely influenced by soul; their God is identical with the world, and yet he is more than mere self-moving matter; he is the 'fiery reason of the world,' and this reason works that which is reasonable and purposeful, like the 'reason-stuff' of Diogenes of Apollonia, according to laws which man gathers from his consciousness, and not from his observation of sensible objects. Anthropomorphism, there-

fore, teleology, and optimism profoundly dominate the Stoic system, and its true character must be described as 'Pantheistic.'

The Stoics had a strikingly pure and correct doctrine of the freedom of the will. Moral accountability is involved in the fact that conduct flows from the will, and so from the innermost and most essential nature of man; but the manner in which each man's will shapes itself is only a result of the mighty necessity and divine predestination which govern all the machinery of the universe down to the smallest detail. For his thought also man is responsible, because even our judgments are shaped by the influence of our moral character.

The soul, which is bodily in its nature, subsists for a certain time after death: wicked and foolish souls, whose matter is less pure and durable, perish quicker; the good mount to an abode of the blessed, where they remain till they are resolved in the great conflagration of the universe, with everything that exists, into the unity of the divine being.

But how was it that the Stoics, from their lofty theory of morals, proceeded to a theory of the universe standing in many points so near to Materialism? Zeller thinks that, in consequence of their practical tendency, they had conceived their metaphysic in the simplest form in which it is supplied by the immediate experience of practical life.[57] There is a good deal to be said for this view of the

[57] Zeller, iii. 1, S. 113 ff., E. T. (Reichel, Stoics, &c.), p. 129: "Originally devoting themselves with all their energies to practical inquiries, in their theory of nature the Stoics occupied the ground of ordinary common sense, which knows of no real object except what is grossly sensible and corporeal. In all their speculations their primary aim was to discover a firm basis for human actions. In actions, however, men are brought into direct contact with external objects. The objects then presented to the senses are regarded by them as real things, nor is an opportunity afforded for doubting their real being. Their reality is practically taken for granted, because of the influence they exercise on man, and because they serve as objects for the exercise of man's powers. In every such exercise of power both subject and object are material. Even when an impression is conveyed to the soul of man, the direct instrument is something

question; but there is in the system of Epikuros a still deeper link between ethical and physical science. And is such a link wanting in the case of the Stoics? May it not be, perhaps, that Zeno found a support for his theory of virtue just in this thought of the absolute unity of the universe? Aristotle leaves us stranded in the dualism of a transcendental God and the world he governs, of the body with an animal soul and the separable immortal spirit: an excellent foundation for the consciousness of medieval Christianity, broken and yearning from the dust towards eternity, but not for the haughty self-sufficiency of the Stoic.

The step from absolute Monism to the physic of the Stoics is now easy, for either all bodies must be reduced to pure idea, or all spirits, including that which moves in them, must become bodies; and even if, with the Stoics, we simply define body as that which is *extended in space*, the difference between these two views, utterly opposed as they seem to one another, is not really great.—Yet here we must break off, since whatever may have been the connection between the ethic and the physic of the Stoics, the speculations as to space, in its relation to the world of ideas and of bodies, belong to modern times.—We turn now to the revival by Epikuros of a consequent Materialistic theory, resting upon a purely mechanical theory of the world.

The father of Epikuros is said to have been a poor schoolmaster of Athens, who became a *klerûchos*, or colonist, at Samos. There Epikuros was born towards the

material—the voice or the gesture. In the region of experience there are no such things as non-material impressions." Comp. *ibid.*, S. 325 ff., E. T. 362, where an admirable parallel is drawn between the Stoical ethic and their theoretical views of the absolute sway of the divine will in the world, while, on the other hand, Materialism there too is deduced merely from the predominance of practical interests. But, in fact, Materialism, in the wider sense (pantheistic or mechanical), was for the ancients an almost inevitable consequence of rigorous Monism and Determinism; for they were still far removed from the modern Idealism of a Descartes, Leibniz, or Kant.

end of the year 342, or at the beginning of 341. In his fourteenth year, it is said, he studied Hesiod's *Cosmogony* at school, and finding that everything was explained to arise from chaos, he cried out and asked, Whence, then, came chaos? To this his teacher had no reply that would content him, and from that hour the young Epikuros began to philosophise for himself.

Epikuros must, in fact, be regarded as self-taught, although the most important ideas which he incorporated in his system were individually already commonly known. His general education is said to have been deficient. He joined himself to none of the then prevailing schools, but studied the more industriously the writings of Demokritos, which supplied him with the corner-stone of his cosmology, the doctrine of atoms. Nausiphanes, a somewhat sceptical follower of Demokritos, is said to have first introduced this doctrine to him at Samos.

Nevertheless, we cannot assume that it was through ignorance of other systems that Epikuros took his own course; for already as a youth of eighteen he had been to Athens, and heard probably Xenokrates, the pupil of Plato, whilst Aristotle, accused of atheism, was at Chalcis, looking towards his end.

How different then the state of Greece from what it had been a hundred years before, whilst Protagoras was still teaching! Then Athens, the home of free culture, had reached its highest point of external power. Art and literature were in their fullest bloom. Philosophy was animated by all the vigour and arrogance of youth. Epikuros studied at Athens at the time of the downfall of liberty.

Thebes had perished, and Demosthenes lived in exile. From Asia were heard the news of Alexander's victories. The East disclosed its marvels; and as the circle of vision was widened, the Hellenic fatherland, with its glorious past, appeared more and more as a step that had been taken on the way to new developments, whose whence and whither no man yet knew.

Alexander died suddenly at Babylon; the last convulsive struggle of freedom followed, only to be cruelly repressed by Antipater. Amidst this confusion Epikuros again left Athens, in order to return to his parents' Ionian home. Afterwards he is supposed to have taught at Kolophon, Mitylene, and Lampsakos; and at the last-named place he gained his first disciples. He only returned to Athens in the maturity of years, and there bought a garden, where he dwelt with his disciples. It is said to have borne as an inscription, "Stranger, here will it be well with thee: here pleasure is the highest good." Here lived Epikuros with his followers, temperately and simply, in harmonious effort, in heartfelt friendship, as in a united family. By his will he bequeathed the garden to his school, which for a long time still had its centre there. The whole of antiquity furnishes no brighter and purer example of fellowship than that of Epikuros and his school.

Epikuros never filled any public office; and yet he is said to have loved his country. He never came into conflict with religion, for he sedulously honoured the gods with all conventional observance, without pretending to a belief concerning them which he did not really feel.

The existence of the gods he based upon the pure subjective knowledge which we have of them: and yet that man is not an atheist, he taught, who denies the gods of the multitude, but much rather he who subscribes to the opinions of the multitude concerning the gods. We are to regard them as eternal and immortal beings, whose holiness excludes every thought of care or occupation; and therefore all the events of nature proceed according to eternal laws, and without any interference from the gods, whose majesty is insulted if we suppose that they trouble themselves about us: we must worship them, nevertheless, for the sake of their perfection.

If, now, we put together these partly contradictory expressions, there can be no doubt that Epikuros did

really respect the *idea of the gods* as an element of noble human nature, and not the gods themselves as actual objective existences. Only from this point of view, of a subjective and soul-harmonising reverence for the gods, can we explain the contradictions in which otherwise the Epikurean system would necessarily leave us involved.

For if the gods *exist* indeed, but *do nothing*, that would be reason enough for the credulous frivolity of the masses to *believe* in them but not to *worship* them, while Epikuros did in fact just the reverse of this. He reverences the gods for their perfection: this he might equally do whether this perfection is exhibited in their outward actions, or whether it is only developed as an ideal in our thoughts; and this latter seems to have been his view.

In this sense, however, we must not suppose that his reverence for the gods was mere hypocrisy in order to keep on good terms with the mass of the people and the dangerous priesthood: it came really from his heart; for these careless and painless gods did in fact represent, as it were, an incarnated ideal of his philosophy.

It was at the utmost a concession to existing circumstances, and certainly, at the same time, a habit endeared by the associations of youth, when he attached himself to the forms which must of course, from his standpoint, seem at least arbitrary and indifferent.

Thus Epikuros could at once impart a flavour of piety to his life, and still make the central point of his philosophy the effort to win that calmness of the soul which finds its only immovable foundation in deliverance from foolish superstitions.

Epikuros, then, taught expressly that even the motion of the heavenly bodies is not dependent upon the wish or impulse of a divine being; nor are the heavenly bodies themselves divine beings, but everything is governed by an eternal order which regulates the interchange of origination and destruction.

To investigate the reason of this eternal order is the

business of the physical inquirer, and in this knowledge perishable beings find their happiness.

The mere historical knowledge of natural events, without a knowledge of causes, is valueless; for it does not free us from fear nor lift us above superstition. The more causes of change we have discovered, the more we shall attain the calmness of contemplation; and it cannot be supposed that this inquiry can be without result upon our happiness. For the deepest anxieties of the human heart arise from this, that we regard these earthly things as abiding and satisfying, and so we must tremble at all the changes which nevertheless occur. But he who regards change in things as necessarily inherent in their very existence is obviously free from this terror.

Others, believing the old myths, are in fear of eternal torments to come; or, if they are too sensible to believe in these, yet apprehend at least the loss of all feeling which death brings with it as an evil, just as if the soul could still feel this deprivation.

But death is really quite indifferent to us, just because it deprives us of feeling. So long as we are, there is as yet no death; but as soon as death comes, then we exist no more. And yet we cannot but dread even the approach of a thing which in itself has nothing terrible about it Still more foolish is it, of course, to sing the praises of an early death, which we can always secure for ourselves at a moment's notice. There is no more misfortune in life to the man who has really convinced himself that not to live is no misfortune.

Every pleasure is a good, every pain is an evil; but we are not on that account to pursue after every pleasure and to flee from every pain. Peace of soul and freedom from pain are the only lasting pleasures, and these are therefore the true aim of existence.

On this point Epikuros diverges sharply from Aristippos, who placed pleasure in motion, and declared the individual pleasure to be the true object. The tempestuous life

of Aristippos, as compared with the quiet garden-life of Epikuros, shows how their opposite theories were carried out in practice. Unquiet youth and retired age, as well of the nation as of philosophy, seem at once reflected in these contrasts.

None the less was Epikuros opposed to Aristippos, from whom he had learnt so much, in teaching that intellectual pleasure was higher, and to be preferred to physical pleasure; for the mind is stimulated not only by the present, but also by the past and the future.

Yet Epikuros also was so far consistent that he explained that the virtues must be chosen for pleasure's sake alone, just as we resort to medicine for the sake of health; but he added, that virtue is the only permanent element of pleasure; all besides may be separated from it as being perishable. So near, logically, stood Epikuros to his opponents Zeno and Chrysippus, who declared that virtue is the only good; and yet, in consequence of the difference in the points of departure, we find the utmost difference in the systems.

All the virtues are derived by Epikuros from wisdom, which teaches us that man cannot be happy unless he is wise, noble, and just; and, conversely, that man cannot be wise, noble, and just, without being really happy. Physics, in the Epikurean system, were in the service of ethic, and this subordinate position could not but react upon his explanation of nature. For as the whole object of the explanation of nature is to free us from fear and anxiety, the stimulus to inquiry ceases when once the object is attained; and it is attained so soon as it is shown how events can be explained from universal laws. The possibility is enough here; for if an effect *can* be ascribed to natural causes, I need not any longer seek after supernatural ones. Here we recognise a principle which the German Rationalism of the last century frequently applied to the explanation of miracles.

But we are forgetting to ask whether and how we can

prove what is the *real* cause of the events, and this want of a certain distinction has its revenge; for only those explanations will give us lasting satisfaction in which we find a coherence and a principle of unity. Epikuros, as we shall see further on, possessed such a principle in the bold thought that, given the infinity of worlds, then everything that is at all possible is somewhere at some time realised in the universe; but this general idea has very little to do with the ethical aim of physics, which must have reference to *our* world.

Thus, with regard to the moon, Epikuros supposed that it might have its own light, but its light might also come from the sun. If it is suddenly eclipsed, it may be that there is a temporary extinction of the light; it may also be that the earth has interposed between the sun and moon, and so by its shadow causes the eclipse.

The latter opinion seems indeed to have been specially held by the Epikureans; only it is so combined with the other that we see how unimportant it was considered to decide between them. You may choose which view you prefer—only let your explanation remain a natural one. This natural explanation must rest upon analogy with other known cases; for Epikuros declares that the right study of nature must not arbitrarily propose new laws, but must everywhere base itself upon actually observed facts. So soon as we abandon the way of observation, we have lost the traces of nature, and are straying into the region of idle fantasies.

In other respects Epikuros's theory of nature is almost entirely that of Demokritos, only fuller accounts of it have been preserved to us. The following propositions contain what is most important in it:—

Out of nothing nothing comes, for otherwise anything could come out of anything. Everything that is is body; the only thing that is not body is empty space.

Amongst bodies some are formed by combination; the

others are those out of which all combinations are formed. These are indivisible and absolutely immutable.

The universe is unbounded, and therefore the number of bodies must also be endless.

The atoms are in constant motion, in part widely removed from each other, while in part they approach each other and combine. But of this there was never a beginning. The atoms have no qualities except size, figure, and weight.

This proposition, which formally denies the existence of intrinsic qualities as opposed to external motions and combinations, forms one of the characteristic features of all Materialism. With the assumption of intrinsic qualities the atom has already become a monad, and we pass on into Idealism or into pantheistic Naturalism.

The atoms are smaller than any measurable size. They have a size, but not this or that particular size, for none that can be mentioned will apply to them.

Similarly the time in which the atoms move in the void is quite inexpressibly short; their movement is absolutely without hindrance. The figures of the atoms are of inexpressible variety, and yet the number of actually occurring forms is not absolutely infinite, because in that case the formations possible in the universe could not be confined within definite, even though extremely wide, limits.[58]

In a finite body the number as well as the variety of the atoms is limited, and therefore there is no such thing as infinite divisibility.

In void space there is no above or below; and yet even here one direction of motion must be opposed to another. Such directions are innumerable, and with regard to them we can in thought imagine above and below.

[58] For the divergences of Epikuros from Demokritos we must refer partly to the section on Demokritos (p. 25 foll.), partly to the extracts from Lucretius's *De Natura*, which will be found further on, and the special discussions in connection with it.

The soul is a fine substance distributed through the whole mass of body, and most resembles the air with an infusion of warmth.—Here we must again interrupt the ideas of Epikuros to make a brief remark.

To our present Materialists, this very theory of a soul like this, consisting of fine matter, would, of all others, be most repugnant. But whilst we now find such theories, for the most part, only amongst fanciful Dualists, the case was quite different when nothing was known as to the nature of nerve-force or the functions of the brain. The material soul of Epikuros is a genuine constituent of the bodily life, an *organ*, and not a heterogeneous substance existing independently, and continuing to exist after the dissolution of the body. This is quite clear from the following developments:—

The body encloses the soul, and conducts sensations to it: it shares in sensation by means of the soul, and yet imperfectly, and it loses this power of sensation at the dissolution of the soul. If the body is destroyed the soul must also be dissolved.

The origin of mental images is due to a constant streaming of fine particles from the surface of bodies. In this manner actual material copies of things enter into us.

Hearing, too, takes place through a current proceeding from sounding bodies. As soon as the sound arises, the report is formed by certain billows, which produce, as it were, a current of air.

More interesting than these hypotheses, which, in the absence of all true scientific inquiry, could only be childishly inadequate, are those explanations which are more independent of clear, positive knowledge. Thus Epikuros attempted to explain by natural laws the development of speech and of knowledge. The names of things did not originate as a formal system, but through men's uttering peculiar sounds varying according to the nature of things. The use of those sounds was confirmed by convention, and so the various languages were de-

veloped. New objects occasioned new sounds, which then spread through employment, and became generally intelligible.

Nature has taught man many things, and so placed him that he must act. When he is brought into contact with objects, reflection and inquiry arise, in some cases quicker, in others more slowly; and so the development of ideas progresses ceaselessly through certain stages.

Epikuros did least for the extension of logic, and that deliberately, and from reasons which do all honour to his intelligence as well as his character. If one reflects how the great mass of the Greek philosophers sought to shine by paradoxical assertions and dialectic tricks, and for the most part confounded things instead of explaining them, we can only praise the sound sense of Epikuros, which led him to reject dialectic, as not only useless but pernicious. For the same reasons he employed no strange-sounding technical terminology, but explained everything in mere household words. From the orator he desired nothing but clearness; nevertheless he sought to establish a canon of truth.

And here again we come upon a point on which Epikuros is almost universally misunderstood and undervalued. That his logic is very simple is generally admitted, but with a contemptuous sneer that is not justified by the true state of the case. The logic of Epikuros is distinctly sensationalistic and empirical; from this standpoint, then, it is to be judged, and it can be shown that its essential principles, so far as we can gather them from the mutilated and in many ways obscure accounts which have come to us, are not only clear and consistent, but are also irresistible up to the point where the one-sidedness of all empiricism finds its limits.

The ultimate basis of all knowledge is sensible perception. And this is in itself always true: only through its relation to an object does error arise. If a madman sees a dragon, this perception, as such, is not deceptive;

he does perceive the picture of a dragon, and no reason and no law of thought can alter the fact. But if he believes that this dragon will devour him, there he is wrong. The error lies in the referring of the perception to an objective fact. It is an error of the same kind as when a scientific man, after the most sober inquiry, incorrectly explains some celestial phenomenon. The perception is true, the reference to an assumed cause is false.

Aristotle of course teaches that true and false are shown only in the synthesis of subject and predicate in the judgment. A chimera is neither false nor true, but if any one asserts that the chimera exists or does not exist, then these propositions are either true or false.

Ueberweg maintains* that Epikuros has confounded truth and psychical reality. But in order to maintain this he must define truth as the "agreement of the psychical image with a really existing object," and this definition agrees indeed with Ueberweg's logic, only it is neither commonly accepted nor necessary.

Let us dismiss the logomachy. If Epikuros's madman forms to himself the judgment, 'This phenomenon is the image of a dragon,' Aristotle can no longer object to the truth of this judgment. That the judgment of the madman in reality (though not always) is quite a different one is here irrelevant.

This remark should also be a sufficient reply to Ueberweg; for there is certainly nothing which has, in the strongest sense of the term, so 'independent' an existence of our ideas, from which everything else is first derived. But Ueberweg understands the matter differently, and therefore here too a different reply shall be made to the mere verbal misapprehension. In his phraseology Epikuros's perception can no longer be called 'true,' but yet it may be called 'certain,' because it is simple, incontrovertible, immediately given.

And now it may be asked, Is this immediate certainty

[* Hist. Phil., i. 4th ed. p. 220, E. T. 204.—Tr.]

of the particular individual concrete perceptions the foundation of all 'truth,' even if we understand it in Ueberweg's sense or not? The Empiricist will say Yes; the Idealist (that is, the Platonic, not perhaps the Berkeleian) will say No. Further on we will go more deeply into this contradiction. Here it is sufficient to make Epikuros's train of thought perfectly clear, and so to secure his justification.

So far the standpoint of Epikuros is that of Protagoras, and it is therefore a complete misapprehension to suppose that he can be refuted by drawing the inference: So then contradictory propositions according to Epikuros, as according to Protagoras, may be equally true. Epikuros answers: Yes, they are true—each for its object. The contradictory assertions as to the same object have, however, only nominally the same object. The objects are different: for they are not the 'things in themselves,' but the mental images of them. These are the only real starting-point. The 'things in themselves' do not even form the second, but only the third step in the process of knowledge.[59]

[59] Zeller iii. 1, 2 Aufl., p. 365 foll., treats this point as a "difficulty," as to the solution of which Epikuros appears to have troubled himself but little. But the expression is remarkable that, on the view of Pythagoras, *errors of the senses become impossible;* while shortly afterwards follows the correct remark that the error lies not in the *perception* but in the *judgment.* The eye, for example, looking upon a stick plunged into the water, sees it broken. This perception, however, of a broken stick, is not only thoroughly true and trustworthy (compare what is said in the text against Ueberweg), but it is, moreover, a very important basis of the theory of the refraction of light, which, without such perceptions, could never have been attained. The judgment that the stick, conceived as an objective thing, is broken, and will therefore appear so out of the water also, is indeed false; but it can be easily corrected by a second perception. If now the perceptions taken in themselves were not collectively quite trustworthy, and the basis of all further knowledge, one might propose to annul one of them entirely, as we simply and absolutely abandon an incorrect judgment. But it is obvious that that is quite impossible. Even such errors of the senses (errors unknown to the ancients), in which an incorrect judgment (false induction) immediately and unconsciously interferes with and affects the function of perception, as, for instance, the phenomena of dark spots on the retina, are as *perceptions* trustworthy. When Zeller believes that the difficulty would be only carried a step further

Epikuros goes beyond Protagoras in the safe path of Empiricism, since he recognises the formation of memory-pictures, which arise from *repeated* perception, and which, therefore, as compared with the individual perception, have already the character of a universal. This universal, or what is equivalent to a universal, idea (for example, the idea of a horse after one has seen different animals of this kind), is less certain than the original individual idea, but can at the same time, just because of its universal nature, play a much greater part in thought.

It forms the middle term in the passage to the causes, that is, in the inquiry after the 'thing in itself.' This inquiry it is that first results in science, for what is all Atomism but a theory as to the 'thing in itself,' which lies at the bottom of phenomena? Similarly the criterion of the truth of all universals is always their ratification by perception, the basis of all knowledge. The universals are not, therefore, by any means especially certain or true. They are, primarily, only 'opinions' which are spontaneously developed out of the contact of man with things.

These opinions are true if they are ratified by percep-

back by the distinction between the perception of a *picture* and perception of an *object*, that seems to rest upon a misunderstanding. The question, "How may the true be distinguished from the untrue pictures?" is thus to be answered, that every picture is "true;" that is, the object is given with complete certainty in that modification which necessarily follows from the constitution of the media and of our organs. Our proper task is never, therefore, to reject a picture absolutely as "untrue," and to substitute another for it, but to recognise as such a *modification* of the original picture. This takes place quite simply, like all other recognition, through the formation of a προλήψις and then of a δόξα out of repeated perceptions. Let us compare, for instance, the way in which Rousseau makes his Emile develop the notion of the refraction of light out of the picture of the broken stick. And although Epikuros may not have treated the question with this keenness, yet obviously his remark (if Cicero reports correctly), that it is the task of the wise man to distinguish mere opinion (*opinio*) from certainty (*perspicuitas*), is not the whole answer that Epikuros's system affords on the matter. Nay, it is perfectly clear that this very distinction must be produced in the same way as all other knowledge; by the formation of a notion, and, in connection with it, a belief naturally developed from the perception itself as to the causes of the modified phenomenon.

tions. The Empiricists of our own day demand that they shall be ratified by 'facts.' But as to the existence of a fact, we can again only appeal to perception. If the logician objects that it is not perception but methodical proof that determines the existence of a fact, we must remind him in turn that this methodical proof, in the last result, can only be referred to perceptions and their interpretation. The elementary fact, therefore, is always the perception, and the difference of the standpoints shows itself only in this—whether the method of verification is purely empirical, or whether it rests eventually upon propositions which are viewed as necessarily prior to all experience. This controversy we need not here decide. It is enough that we have shown that, even in the matter of logic, we have been led by hostile traditions into unfairly reproaching Epikuros with superficiality and inconsistency, whilst from his own standpoint he goes to work at least as rationally as Descartes, for example, who also rejects the whole traditional logic, and substitutes a few simpler rules of investigation.

Epikuros was the most fertile writer amongst the ancients, with the exception of the Stoic Chrysippos, who wished to surpass him in this respect, and succeeded; but whilst the books of Chrysippos abounded in borrowed passages and quotations, Epikuros never made a quotation, but carved everything out of his own materials.

In this disdain of all quotations, we cannot but recognise that radicalism which is not unfrequently united with Materialistic views—a disdain of the historical, as compared with the scientific, element. Let us take these three points together: that Epikuros was self-taught, and attached himself to none of the dominant schools; that he hated dialectic, and employed a universally intelligible mode of speech; finally, that he never quoted, and, as a rule, simply ignored those who thought differently from himself; and we have here an adequate explanation of the hatred that so many narrow philosophers have poured

upon him. The charge of want of thoroughness flows from the same source, for still in our own days nothing is so common as the tendency to seek the thoroughness of a system in an elaborate scheme of unintelligible phrases. If our contemporary Materialists in their opposition to philosophical terminology go too far, and often condemn for want of clearness terms which have a quite fixed meaning, although one not to be guessed at once by a beginner, this is chiefly to be ascribed to a neglect of the historical and exact meaning of the expressions. Without having grounds for making definitely a similar reproach against Epikuros, we must not overlook this common feature of the neglect of history. In this, as in so many other respects, the keenest contrast to Materialism is to be found in Aristotle.

It is worth noticing that Greek philosophy, so far as it is expressed in sound systems, having a character of unity, and based upon purely ethical and intellectual ideas, terminates with Epikuros and his school, as it begins with the Ionian natural philosophers. The further developments belong to the positive sciences, while speculative philosophy, in Neo-Platonism, becomes thoroughly degenerate.

As the aged Epikuros cheerfully closed his life in the midst of his circle of disciples at Athens, a new theatre of Greek intellectual life was already opened at Alexandria.

Within very recent times it was the fashion to use the 'Alexandrian spirit' as the synonyme for superficial sciolism and peddling pedantry; and even yet, while we recognise the claims of Alexandrian research, we usually couple with this recognition the thought that only the complete shipwreck of a vigorous national life had been able to supply such room for the purely theoretical need of knowledge.

In the face of these notions, it is important for our object to point out the creative energy, the living spark of

noble effort—an effort as bold and comprehensive in its aims as it was bold and honest in its means—which the learned world of Alexandria presents to us on a nearer view.

For if the Greek philosophy, springing from a Materialistic origin, after a short and brilliant passage through all conceivable standpoints, found its termination in Materialistic systems and Materialistic modifications of other systems, we are entitled to ask what was the final result of all these transformations?

But the 'final result' may be variously understood. Philosophers have sometimes approved of a construction which compares the career of philosophy to the course of a day from night through morning, noon, and evening again to night. The natural philosophers of Ionia on the one hand, and Epikureanism on the other, fall on this theory in the region of night.

We must not forget, however, that the conclusion of Greek philosophy in the return of Epikuros to the simplest principles did not lead the nation back to the condition of poetical childhood, but much rather formed the natural transition to a period of the most fruitful inquiries in the sphere of the positive sciences.

Historians are very fond of maintaining that in Greece the rapid development of philosophy produced a hopeless separation between the thought of the intellectual aristocracy and the imaginations and aspirations of the people, and that this separation brought about the national catastrophe. We may, indeed, grant all this, and yet hold that the fall of individual nations does not hinder the progress of humanity; nay, that in the very fall of the nation the result of its efforts, like the seeds of the dying plant, reaches its utmost ripeness and perfection. If we see, then, how such results became really in later times the life-germs of new and unlooked-for progress, we shall regard the career of philosophy and of scientific inquiry from a higher and freer standpoint. And it may be

actually proved that the brilliant scientific outburst of our own times, at the era of its development, at every point connects itself with Alexandrian traditions.

All the world has heard of the libraries and schools of Alexandria, of the munificence of her kings, the zeal of her teachers and scholars. But it is not all this that constitutes the historical importance of Alexandria: it is much more the very marrow of all science, the method which here appeared first after a sort that determined the course of all after-time; and this progress in methodology is not confined to this or that science, nor to Alexandria itself, but is much rather the common note of Hellenic research after the decadence of speculative philosophy.

Grammar, the first foundations of which had been laid by the Sophists, found in this period an Aristarchos of Samothrace, the pattern of critics, a man from whom the philology of our own day has still found something to learn.

In history, Polybios began to set causes and effects in organic connection. In Manetho's chronological inquiries the great Scaliger sought in modern times a point of departure.

Euklid created the method of geometry, and provided the elements which yet constitute the basis of this science.

Archimedes found in the theory of the lever the foundation of all statics: from him until Galilei the mechanical sciences made no more progress.

But amongst the sciences of this epoch, astronomy shines with special brilliancy, after having rested from the time of Thales and Anaximander. With great emphasis speaks Whewell of the 'inductive age of Hipparchos,' for it was in fact the inductive method in all its thoroughness and fertility that was for the first time handled by Hipparchos. The cogency of the inductive method rests, however, upon the presupposition of that uniformity and necessity in the course of nature which

Demokritos had first brought distinctly into view. Hence is to be explained, moreover, the far-reaching influence of astronomy in the days of Copernicus and Keppler, the true restorers of that method which Bacon formulated.

The necessary complement of the inductive method, the second corner-stone of our modern science, is, of course, experiment. This, too, had its birth in Alexandria, and in its schools of medicine.

Anatomy was made the basis of medical knowledge by Herophilos and Erasistratos, and even vivisection appears to have been employed. A school of great influence grew up, which made experience, in the best sense of the word, its grand principle, and great progress was the reward of their efforts. If we include all these brilliant phenomena in one view, the intellectual activity of Alexandria must inspire in us a high regard. It was not the want of internal vitality, but the course of history, which speedily put an end to this activity; and we may say that the renascence of the sciences was chiefly a revival of Alexandrian principles.

Nor must we undervalue the results of positive research in antiquity. We here leave out of sight grammar and logic, history and philology, whose great and permanent achievements none will controvert. We will rather point out that in those very sciences, in which the last few centuries have attained such an unequalled development, the preparatory achievements of Greek inquiry were of high importance.

Whoever contemplates the Homeric world, with its ceaseless miracles, the narrow space of its earth-surface, and its naive conceptions of the heavens and the stars, must confess that the capable among the Greeks had entirely to remodel their notions of the world. Of the wisdom of the Indians and the Egyptians only fragments reached them, which, without answering efforts of their own, could never have attained to any serious development. The distorted representation of the few countries

around the Mediterranean, which it was already clear to Plato must form only a very small portion of the whole earth, the fables of the Hyperboreans and the peoples inhabiting the farthest west beyond the setting of the sun, the myths of Scylla and Charybdis: all these are traits from which we learn at once that the conceptions of science and poetry are as yet scarcely distinguished. The events correspond with the scene. Every natural occurrence appears muffled by some divine apparition. Those beings out of which the popular sense of beauty created such splendid types of human strength and grace, are everywhere and nowhere, and subvert every thought of a rigid connection between cause and effect. The gods are not wholly omnipotent, and yet there are no fixed limits to their power. Everything is possible, and nothing can be depended upon. The *reductio ad absurdum* of the Greek Materialists—"since in that case anything might arise from anything"—has in this world no application: anything may actually arise from anything, and since no leaf can fall, no streak of mist rise up, no ray of light shine—not to speak of lightning and thunder—without the intervention of some deity, no starting-point for science is here to be discerned.

With the Romans, apart from the fact that they received their first scientific impulses from the Greeks, it was, if possible, still worse; except that the augury by birds, and especially the observation of storms, so studiously pursued by the Etruscans, made known a series of positive facts in the sphere of natural occurrences. But the nascent Graeco-Roman culture found scarcely the barest rudiments of astronomy and meteorology, no trace of physics and physiology, not a suspicion of chemistry. Whatever happened was commonplace, accidental, or miraculous, but not an object of scientific cognisance. In a word, there was still lacking the very beginning of natural science—Hypothesis.

At the termination of the short and brilliant career of

ancient civilisation, we find a complete change. The axiom of the uniformity and knowableness of natural events stands removed above all doubt; the effort after this knowledge has found its destined path. Positive natural science, directed to the precise investigation of particular facts, and the clear co-ordination of the results of these inquiries, has already completely separated itself from the speculative philosophy of nature, which seeks to reach beyond the bounds of experience, and rise to the ultimate causes of things.

Physical research has attained a definite method. Deliberate has supplanted merely casual observation: instruments lend precision to observation and secure its results; experiments even are being made.

The exact sciences, by a brilliant elaboration and perfecting of mathematics, had secured that instrument which, in the hands of the Greeks, the Arabs, and the Teutonic-Romanic peoples of modern times, step by step brought about the most magnificent practical and theoretical results. Plato and Pythagoras inspired their pupils to the cultivation of a mathematical sense.

The books of Euklid constitute still in the country of Newton, after more than two thousand years, the foundation of mathematical instruction, and the primitive synthetic method celebrated in the Mathematical Elements of Natural Philosophy—(*Naturalis philosophiae principia mathematica*)—its last and greatest triumph.

Astronomy, under the guidance of subtle and complicated hypotheses as to the motion of the heavenly bodies, accomplished incomparably more than those primitive diviners of the stars, the peoples of India, Babylon, and Egypt, had ever succeeded in attaining. A very nearly exact calculation of the positions of the planets, of eclipses of the sun and moon, an accurate representation and grouping of the fixed stars, does not exhaust the list of what was achieved; and even the root-idea of the Copernican system, the placing of the sun in the centre of the

universe, is to be found in Aristarchos of Samos, with whose views Copernicus was very probably acquainted.

If we inspect the map of Ptolemy, we find still, it is true, the fabulous southern land uniting Africa to Further India, and converting the Indian Ocean into a second and greater Mediterranean; but Ptolemy represents this country as purely hypothetical; and how charming it looks already in Europe and the inner portions of Asia and Africa! Long before the spherical shape of the earth had been generally recognised. A methodical indication of place by means of degrees of longitude and latitude forms a strong support for the maintenance of what has been reached, and the incorporation of all fresh discoveries. Even the circumference of the earth had been already estimated by means of an ingenious astronomical method. Though this estimate contained an error, yet this very error led to the discovery of America, when Columbus, relying upon Ptolemy, sought the western passage to the East Indies.

Long before Ptolemy the researches of Aristotle and his predecessors had diffused a mass of information on the fauna and flora of more or less distant countries. Accurate description, anatomical examination of the internal structure of organic bodies, paved the way for a comprehensive survey of the forms which, from the lowest upward to the highest, were conceived as a progressive realisation of formative forces, which end by producing in man the most perfect of earthly things. Although in this view again numerous errors were involved, yet so long as the spirit of inquiry remained active, the foundation was of infinite value. The victorious campaigns of Alexander in the East enriched the sciences, and by the help of comparison still further enlarged and opened the field of observation. The industry of Alexandria accumulated and sifted materials. And so, when the elder Pliny attempted in his encyclopedic work to represent the whole field of nature and art, a nearer insight into the relations between

human life and the universe was already possible. To this restless spirit, who closed his great work with an invocation to Nature, the universal mother, and ended his life whilst engaged in observing a volcano, the influence of nature upon the intellectual life of mankind constituted a fruitful point of view, and an inspiring stimulus to inquiry.

The physics of the ancients embrace a notion, built upon experiment, of the main principles of acoustics, of optics, of statics, and the theory of gases and vapours. From the researches of the Pythagoreans into the pitch and depth of musical tones, as conditioned by the relative masses of the sounding bodies, to the experiments of Ptolemy on the refraction of light, the spirit of Hellenic research accomplished a long career of fruitful productiveness. The mighty buildings, war-engines, and earthworks of the Romans were based upon a scientific theory, by the exact application of which they were carried out with the utmost possible care and expedition, while the much more colossal works of the Oriental nations were produced rather by the prodigal expenditure of time and labour under the coercion of despotic dynasties.

Scientific medicine, culminating in Galen of Pergamos, had already explained the bodily life in its most difficult element—the nervous activity. The brain, previously regarded as an inert mass, whose use was still less understood than that of the spleen in modern times, had been elevated to the seat of the soul and the functions of sensation. Sömmering, in the last century, found the theory of the brain almost where Galen had left it. The ancients were acquainted with the importance of the spinal marrow, and thousands of years before Sir Charles Bell they had distinguished the nerves of sensibility and movement; and Galen cured paralysis of the fingers, to the astonishment of his contemporaries, by acting upon those parts of the spine from which the implicated nerves took their rise. No wonder, then, that Galen already regarded ideas as results of bodily conditions.

When we behold knowledge thus accumulating from all sides—knowledge which strikes deep into the heart of nature, and already presupposes the axiom of the uniformity of events—we must ask the question, How far did ancient Materialism contribute to the attainment of this knowledge and these views?

And the answer to this question will at first sight appear very curious. For not only does scarcely a single one of the great discoverers—with the solitary exception of Demokritos—distinctly belong to the Materialistic school, but we find amongst the most honourable names a long series of men belonging to an utterly opposite, idealistic, formalistic, and even enthusiastic tendency.

And special notice must here be paid to mathematics. Plato, the first father of an enthusiasm which became in the course of history at one time beautiful and profound, at another fanatical and delirious, is at the same time the intellectual progenitor of a line of inquirers who carried the clearest and most consequent of all sciences, mathematics, to the highest point it was to reach in antiquity. The Alexandrian mathematicians belonged almost wholly to the Platonic school, and even when the development of Neo-Platonism began, and the troubled fermentations of the great religious crisis made their way into philosophy, this school still produced great mathematicians. Theon and his noble daughter Hypatia, martyred by the Christian rabble, may serve to indicate this stage. A similar tendency proceeded from Pythagoras, whose school produced in Archytas a mathematician of the first order. By the side of these the Epicurean Polyaenos is scarcely to be mentioned. Even Aristarchos of Samos, the forerunner of Copernicus, clung to Pythagorean traditions. The great Hipparchos, the discoverer of the precession of the equinoxes, believed in the divine origin of the human soul. Eratosthenes belongs to the middle academy, which corrupted Platonism by a sceptical element. Pliny, Ptolemy, Galen, without any exact system, leaned to pantheistic

views, and would perhaps, two hundred years earlier, have been confounded with the proper followers of Materialism under the common name of Atheism and Naturalism. But Pliny favoured no philosophical system, although he stands in open opposition to popular beliefs, and leans in his views to Stoicism. Ptolemy was entangled in astrology, and in the general principles of his philosophy, at all events, follows Aristotle rather than Epikuros. Galen, who was more of a philosopher than any of them, is an Eclectic, and is acquainted with the most various systems, yet he shows himself least inclined to the Epikurean: only in the theory of knowledge he held the immediate certainty of sense-perceptions; but he supplemented it by assuming immediate truths of the reason, which are certain previous to all experience.[60]

We see easily enough, however, that this slender participation of Materialism in the achievements of positive inquiry is not casual; that it is especially not to be attributed merely to the quietistic and contemplative character of Epikureanism, but that, in fact, the ideal element (*Moment*) with the conquerors of the sciences stands in the closest connection with their inventions and discoveries.

Here we must not allow an appreciation to escape us of the great truth that it is not what is objectively right and reasonable that most invites man, not even that which

[60] The passage contained at p. 65 of the first edition, in which the Index of Humboldt's "Kosmos" was employed to prove the scientific importance of Aristotle, has been retracted on considering that the preservation of the Aristotelian writings in the general destruction of the Greek literature was sufficiently decisive on this point. It is therefore perhaps to be doubted whether the influence of Aristotle has not been too favourably estimated in the passage of Humboldt: "In Plato's hoher Achtung für mathematische Gedankenentwicklung, wie in den alle Organismen umfassenden morphologischen Ansichten des Stagiriten lagen gleichsam die Keime aller späterer Fortschritte der Naturwissenschaft." We must not, indeed, overlook the importance of teleological hypotheses in the sphere of organic discovery, but the great development of modern science rests upon the liberation from the tyranny of this 'organic view of things.' The knowledge of inorganic nature, and therewith of the most universal laws of nature, connects itself, in fact, much more closely with the principle of Demokritos, through which physics and chemistry first became possible.

leads him to the greatest fulness of objective truth. As the falling body reaches the goal more quickly upon the brachystochrone than upon an inclined plane, so it is a result of the complex organisation of man that in many cases the roundabout course through the play of imagination leads more quickly to the apprehension of pure truth than the sober effort to penetrate the closest and most various disguises.

There is no room to doubt that the Atomism of the ancients, though far from possessing absolute truth, yet comes incomparably nearer to the essential reality of things, so far as science can understand it, than the Numerical theory of the Pythagoreans or the Ideal theory of Plato; at least it is a much straighter and directer step to the existing phenomena of nature than those vague and hesitating philosophemes which spring almost wholly out of the speculative poesy of individual souls. But the ideal theory of Plato is not to be separated from the man's immeasurable love for the pure forms in which all that is fortuitous and abnormal falls away, and the mathematical idea of all figures is regarded. And so it is with the number-theory of the Pythagoreans. The inner love for all that is harmonious, the tendency of the spirit to bury itself in the pure numerical relations of music and mathematics, produced inventive thought in the individual soul. So from the first erection of the *Μηδεὶς ἀγεωμέτρητος εἰσίτω* until the termination of the ancient civilisation, there ran this common characteristic through the history of invention and discovery—that the tendency of the spirit to the supersensuous helped to open the laws of the sense-world of phenomena on the path of abstraction.

Where, then, are the services of Materialism? Or, in addition to all its other services to art, poetry, and sensibility, must the preference also be given to fanciful speculation in relation even to the exact sciences? Obviously not: the thing has its reverse side, and this appears if we

regard the indirect effects of Materialism and its relation to scientific method.

Although we may assign great importance to the subjective impulse, to the individual conjecture of certain final causes for the tendency and force of the movement towards truth, yet we must not for a moment lose from view how it is just this fantastic and arbitrary mythological standpoint which has so long and so seriously hampered the progress of knowledge, and to the widest extent still continues to do so. As soon as man attains to the sober, clear, and definite observation of individual events, so soon as he connects the product of this observation with a definite, though, it may be, an erroneous theory, if it be at least a firm and simple one, further progress is secured. This, when it occurs, is easily to be distinguished from the processes of the devising and imagining certain final causes. Though this, as we have just shown, may have, under favourable circumstances, a high subjective value, depending on the interchange of intellectual forces, yet the beginning of this clear, methodical observation of things is in a sense the first true beginning of contact with things themselves. The value of this tendency is objective. Things, at the same time, demand that we shall so approach them, and only when we put a carefully considered question, does nature afford us an answer. And here we must refer to that starting-point of Greek scientific activity which is to be sought in Demokritos and the rationalising influence of his system. This rationalising influence benefited the whole nation; it was completed in the simplest and soberest observation of things which can be imagined—in the resolution of the varying and changeful universe into unalterable but mobile particles. Although this principle, most closely connected as it was with the Epikurean Materialism, has only attained its full significance in modern ages, yet it obviously exercised, as the first instance of a complete and vivid representation of all changes, a very deep influence upon the ancients also. And yet Plato himself resolved into mobile

elementary bodies his 'non-existent,' yet nevertheless indispensable, matter; and Aristotle, who opposes with all his might the assumption of a void, who maintains the dogma of the continuity of matter—seeks, so far as may be done from this difficult standpoint, to compete with Demokritos in the vividness of his doctrine of change and motion.

It is indeed true that the Atomism of to-day, since chemistry has been worked out, since the theory of vibration, and the mathematical treatment of the forces at work in the smallest particles, stands in very much more direct connection with the positive sciences. But the connecting of all these otherwise inexplicable events of nature, of becoming and perishing, of apparent disappearance, and of the unexplained origin of matter with a single pervading principle, and, as one might say, a palpable foundation, was, for the science of antiquity, the veritable Columbus's egg. The constant interference of gods and demons was set aside by one mighty blow, and whatever speculative natures might choose to fancy of the things that lay behind the phenomenal world, that world itself lay free from mist and exposed to view, and even the genuine disciples of a Plato and a Pythagoras experimented or theorised over natural occurrences without confusing the world of ideas and of mystic numbers with what was immediately given. This confusion, so strongly manifested in some of the modern native philosophers of Germany, first appeared in classical antiquity with the decay of all culture at the era of the Neo-Platonic and Neo-Pythagorean extravagances. It was the healthy morality of thought which, sustained by the counterbalance of sober Materialism, kept the Greek Idealists so long away from such errors. In a certain sense, the whole thought of Greek antiquity, from its beginning till the period of its complete destruction, was under the influence of a Materialistic element. The phenomena of the sensible world were, for the most part, explained out of what are perceived by the senses or represented as so perceived.

Whatever judgment, then, we may in other respects pass upon the whole of the Epikurean system, so much, at all events, is certain, that the scientific research of antiquity drew profit not out of this system, but much more from the general Materialistic principles which underlay it. The school of the Epikureans remained, amongst all the ancient schools, the most fixed and unalterable. Not only are the instances extremely rare in which an Epikurean went over to other systems, but we find scarcely a single attempt to extend or modify the doctrines once accepted until the very last developments of the school. This sectarian narrowness bears witness to the strong predominance of the ethical over the physical side of the system. When Gassendi, in the seventeenth century, revived the system of Epikuros, and opposed it to that of Aristotle, he sought, of course, to maintain the ethics of Epikuros so far as was compatible with Christianity, and it cannot be denied that this too had a strong leavening influence in the development of the modern spirit; but the most important fact was the immediate release of the old Demokritean principle out of the chains of the system. Variously modified by men like Descartes, Newton, and Boyle, the doctrine of elementary corpuscles, and the origin of all phenomena from their movements, became the corner-stone of modern science. Yet the work which had secured for the Epikurean system ever since the revival of learning a powerful influence on modern modes of thought, was the poem of the Roman Lucretius Carus, to whom, on the special ground of his historical importance, we will dedicate a special chapter, which will at the same time afford us a deeper view of the most important portions of the Epikurean doctrine.

CHAPTER V.

THE DIDACTIC POEM OF LUCRETIUS UPON NATURE.

Among all the peoples of antiquity, none perhaps was by nature further removed than were the Romans from Materialistic views. Their religion had its roots deep in superstition; their whole political life was circumscribed by superstitious forms. They clung with peculiar tenacity to the sentiments they inherited; art and science had little charm for them, and they were still less inclined to bury themselves in the contemplation of nature. A practical tendency, more than any other, governed their life, and yet this was by no means materialistic, but was thoroughly spiritual. They valued dominion more than wealth, glory rather than comfort, and triumph more than all. Their virtues were not those of peace, of industrial enterprise, of righteousness, but those of courage, of fortitude, of temperance. The Roman vices were, at least in the beginning, not luxury and wantonness, but hardness, cruelty, and faithlessness. Their power of organisation, in conjunction with their warlike character, had made the nation great, and of this they were proudly conscious. For centuries after their first contact with Greeks there continued that antipathy which sprang from the difference in their characters. It was only after the defeat of Hannibal that Greek art and literature gradually forced their way into Rome. At the same time came luxury and wantonness, with the fanaticism and immorality of the Asiatic and African peoples. The conquered nations crowded to their new capital, and brought about a confusion of all the elements of the old Roman life, while the great more and

more acquired a taste for culture and refined sensuality; generals and governors made spoil of the works of Greek art; schools of Greek philosophy and rhetoric were opened, and frequently again forbidden: men were afraid of the dissolving element in Greek culture, but were less and less able to resist its charms. Even old Cato himself learnt Greek; and when once the language and literature were known, the influence of philosophy could not remain inactive.

In the last days of the Republic this process had been so far completed that every educated Roman understood Greek, the young nobles pursued their studies in Greece, and the best minds endeavoured to form the national literature on Greek models.

At that time, among all the schools of Greek philosophy, there were two which especially captivated the Romans—the Stoic and the Epikurean: the first, with its blunt pride in virtue, naturally related to the Roman character; the second, more in accord with the spirit of the times and their state of progress, but both—and this marks the Roman character—of practical tendency and dogmatic form.

These schools, which, despite their sharp contrasts, had nevertheless so much in common, came into more friendly contact in Rome than in their native land. It is true that the unmeasured calumnies of the Epikureans, which since Chrysippos had been industriously disseminated by the Stoics, were speedily transplanted to Rome. There, too, the mass of men regarded an Epikurean as a slave of his lusts, and, with a double measure of superficiality, ventured to deny his philosophy of nature, because it was protected by no barrier of unintelligible phrases.

Cicero, too, unfortunately, popularised the Epikurean doctrine in the bad sense of the word, and so threw a ludicrous colour over many things which disappears when they are more seriously regarded. But for all that, the Romans were for the most part admirable dilettanti, who were not so deeply concerned for their own school but that

they were able to value opposing views. The security of their position in the world, the universality of their intercourse, kept them free from prejudice; and therefore we find expressions, even in Seneca, which gave Gassendi some authority for making him an Epikurean. Brutus the Stoic and Cassius the Epikurean together imbrue their hands in Cæsar's blood. But this same popular and superficial conception of the Epikurean doctrine, which in Cicero seems so detrimental to it, not only makes it possible for friendship to exist between Epikureanism and the most divergent schools, but it weakens the character of the greater number of the Roman Epikureans, and so gives a certain foundation in fact for the general reprobation. Even at a time when Greek culture was still quite foreign to them, the Romans had begun to exchange the rude austerity of primitive manners for an inclination to indulgence and wantonness, which, as we see so often in the case of individuals, was the more unrestrained in proportion to the novelty of the freer state of things. The change had become distinctly marked so early as the time of Marius and Sulla. The Romans had become practical Materialists, often in the very worst sense of the term, before they had yet learnt the theory.

The theory of Epikuros was, however, in every way purer and nobler than the practice of these Romans; and so now two courses were open to them—they either allowed themselves to be purified, and became modest and temperate, or they corrupted the theory, and so combined the conceptions of its friends and foes, that they ended by having a theory of Epikureanism which corresponded to their habits. Even nobler natures and more thorough philosophers tended to hold by this more convenient form. So it was with Horace when he spoke of himself as a "hog of Epikuros's herd," obviously with sportive irony, but not in the serious and sober sense of the old Epikureanism. And, in fact, Horace not unfrequently points to the Cyrenaic Aristippos as his model.

A more serious attitude was that of Virgil, who also had an Epikurean teacher, but appropriated manifold elements of other systems. Amongst all these semi-philosophers stands a thorough and genuine Epikurean in Titus Lucretius, whose didactic poem, "De Rerum Natura," contributed more than anything else, when learning revived, to resuscitate the doctrines of Epikuros, and to set them in a more favourable light. The Materialists of the last century studied and loved Lucretius, and it is only in our own days that, for the first time, Materialism seems to have broken completely away from the old traditions.

T. Lucretius Carus was born in the year 99, and died in the year 55 B.C. Of his life scarcely anything is known. It appears that amidst the confusion of the civil war, he sought some stay for his inner life, and found it in the philosophy of Epikuros. His great poem was undertaken to make a convert to this school of his friend the poet Memmius. The enthusiasm with which he opposes the salvation to be found in his philosophy to the troubles and nihilism of the times, gives to his work an elevated tone, a fervour of belief and imagination which rises far above the innocent serenity of Epikurean life, and often assumes a Stoic impetus. And yet it is a mistake when Bernhardy maintains in his 'Roman Literature,' that "from Epikuros and his followers he took nothing but the skeleton of a philosophy of nature." This contains a misapprehension of Epikuros, which is still more conspicuous in the following expression of the eminent philologist:

"Lucretius builds indeed upon this foundation of mechanical Nature, but as he was concerned to save the right of personal freedom and of independence of all religious tradition, he seeks to introduce knowledge into practice, to free man, and to place him upon his own feet, by insight into the origin and the nature of things."

We have already seen that this striving after emancipation is the very marrow of the Epikurean system. In Cicero's superficial statement, this was indeed left in the

background; but not in vain has Diogenes Laertius preserved for us in his best biography the very words of Epikuros, which are the basis of the view we have already given.[61]

But if there was anything that attracted Lucretius to Epikuros, and inspired him with this eager enthusiasm, it was just this boldness and moral vigour with which Epikuros robbed the theistic beliefs of their sting, in order to base morality upon an impregnable foundation. This is shown clearly enough by Lucretius, for immediately after the splendid poetical introduction to Memmius, he goes on:

"When human life to view lay foully prostrate upon earth, crushed down under the weight of religion, who showed her head from the quarters of heaven with hideous aspect lowering upon mortals, a man of Greece ventured first to lift up his mortal eyes to her face, and first to withstand her to her face. Him neither story of gods, nor thunderbolts, nor heaven with threatening roar, could quell, but only stirred up the more—the eager courage of his soul filling him with desire to be the first to burst the fast bars of Nature's portals." *

That Lucretius had recourse to many additional sources, that he industriously studied Empedokles, and perhaps in

[61] A refutation of the attempts of Ritter to distinguish between the theories of Lucretius and Epikuros may be found in Zeller, iii. 1, 2 Aufl. p. 499. Everything is to be said on the other hand for the emphasis laid upon his enthusiasm for 'deliverance from the darkness of superstition,' in Teuffel, Gesch. d. röm. Liter., p. 326 (2 Aufl. p. 371). We might say still more confidently, that the really original element in Lucretius is the burning hatred of a pure and noble character against the degrading and demoralising influence of religion, whilst in Epikuros deliverance from religion is indeed an essential aim of philosophy, but an aim which is pursued with dispassionate calmness. We may, of course, at the same time, attribute some part of this difference to the special hatefulness and harmfulness of Roman as compared with Greek religious systems; but yet there remains a kernel still, which may be regarded as a bitter condemnation of religion absolutely; and undoubtedly the importance which Lucretius has acquired in modern ages rests no less upon this special feature than upon his strict Epikureanism.

* Lib. i. 61 sqq. In this and other passages from Lucretius, I have availed myself of Mr. Munro's translation.—Tr.

the scientific parts of his theory has added much from his own observation, we will not deny; yet we must here again remind ourselves that we do not know what treasures were contained in the lost books of Epikuros. Almost all judges assign to the poem of Lucretius a very high place among the productions of pre-Augustan times, in respect of its genius and vigour; and yet the didactic portions are often dry and careless, or connected by sudden transitions with the poetical pictures.

In point of language, Lucretius has an extreme degree of antique roughness and simplicity. The poets of the Augustan age, who felt themselves to be far above the rude art of their predecessors, had great reverence for Lucretius. Virgil has devoted to him the lines—

> "Felix qui potuit rerum cognoscere causas,
> Atque metus omnes et inexorabile fatum
> Subjecit pedibus strepitumque Acherontis avari."

Lucretius, then, without doubt had a powerful influence in the propagation of the Epikurean philosophy among the Romans. This reached its highest point under Augustus; for though it had then no such representative as Lucretius, yet all the gayer spirits of the band of poets who gathered around Maecenas and Augustus were inspired and guided by the spirit of this system.

When, however, under Tiberius and Nero, abominations of all kinds made their appearance, and nearly all enjoyment was poisoned by danger or by shame, the Epikureans retired, and in this last period of heathen philosophy it was the Stoics especially who undertook the struggle against vice and cowardice, and with untroubled courage, as in the case of a Seneca or a Paetus Thrasea, fell a sacrifice to tyranny.

Doubtless the Epikurean philosophy also in its purity, and especially in the extension which had been given to it by the strong moral character of Lucretius, was quite fitted to afford such sublimity of sentiments, only that

the purity, and vigour, and force of comprehension which were displayed by Lucretius were rare in this school, and perhaps from the days of Lucretius to our own are not again to be met with. It is well worth the trouble, then, to look more closely into the work of this remarkable man.

The Introduction to this poem consists of an invocation to the goddess Venus, the giver of life, of prosperity, and of peace, which is marked by a picturesque mythological imaginativeness, a clear and yet profound reach of thought.

Here we are at once face to face with the peculiar Epikurean attitude towards religion. Not only the ideas of religion, but its poetical personifications are employed with an unmistakable fervour and devotion by the same man who, immediately afterwards, in the place quoted above, represents it as the strongest point of his system that it conquers the humiliating terror of the gods.

The early Roman conception of religion, which, in spite of the uncertainty of the etymology, yet certainly expresses the element of the dependence and obligation of man to the divine beings, must, of course, convey to Lucretius exactly what he most deprecates. He challenges the gods, therefore, and attacks religion, without, on this point, our being able to discover any shade of doubt or contradiction in his system.

After he has shown how, by the bold unfettered investigations of the Greeks—where he refers to Epikuros, for though he also celebrates Demokritos, he stands further away from him—religion, which once cruelly oppressed mankind, had been thrown down and trodden underfoot, he raises the question whether this philosophy does not lead us into the paths of immorality and sin.

He shows how, on the contrary, religion is the source of the grossest abominations, and how it is this unreasonable terror of eternal punishments which leads man-

kind to sacrifice their happiness and peace of mind to the horrors of the prophets.[62]

Then the first principle is developed that nothing can ever come from nothing. This proposition, which to-day would rather be regarded as a generalisation from experience, is, quite in accordance with the then scientific standpoint, to be posited as a directive principle at the foundation of all scientific experience.

Any one who imagines that anything can arise out of nothing, can find his prejudice refuted every instant. He who is convinced of the contrary has the true spirit of inquiry, and will discover also the true causes of phenomena. The proposition is, however, established by the consideration that, if things could arise from nothing, this mode of development could, of course, have no limits, and anything might then arise from anything. In that case men might emerge out of the sea, and fishes spring from the soil; no animal, no plant, would continue to propagate itself only after its kind.

This view has so much truth in it, that if things could spring from nothing, we could no longer conceive of any absolute reason why anything should not arise; and such an order of things must become an ever-varying and senseless play of the birth and death of grotesque creations. On the other hand, the regularity of nature, which offers us in spring roses, in summer corn, in autumn grapes, will lead us to conclude that creation accomplishes itself through a concourse of the seeds of things taking place at a fixed time, and thence we may assume that there exist certain bodies which are common constituents of many things, as letters are of words.

Similarly it is shown that nothing, again, is really destroyed, but that the particles of perishing things are dis-

[62] Here occurs, i. 101 (we cite from the edition of Lachmann), the often-quoted and pregnant verse—"Tantum religio potuit suadere malorum."

persed, just as they come together in order to constitute the thing.

The obvious objection that we cannot perceive the particles which are gathered together or dispersed, Lucretius meets by the description of a violent storm. To make his meaning more clear, he introduces also the picture of a rushing torrent, and shows how the invisible particles of the wind produce effects as obvious as the visible particles of the water. Heat, cold, sound are in the same way adduced to prove the existence of an invisible matter. Still finer observation is to be seen in the following examples: Garments which are spread on a surfy shore become damp, and then, if they are placed in the sun, become dry, without our seeing the particles of water either come or go. They must, therefore, be so small as to be invisible. A ring worn on the finger for many years becomes thinner; the falling of water wears away stone; the ploughshare gets used away in the field; the pavement is worn away by the treading of feet; but nature has not made it possible for us to see the particles that disappear every instant. Just so no power of sight can discover the particles which come and go in all the processes of generation and decay. Nature, therefore, works by means of invisible bodies or atoms.

Then follows the proof that the universe is not filled with matter, that it is rather a void space in which the atoms move.

Here, again, the weightiest argument is supposed to be the *a priori* one—that if space were absolutely filled with matter, motion would be impossible, and yet this we perceive constantly. Then come the arguments from experience. Drops of water force their way through the thickest stone. The nourishment of living beings permeates the whole body. Cold and sound force their way through walls. Finally, differences of specific gravity can only be referred to the greater or smaller proportion of void space. The objection that, in the case of fishes, the

water they displace goes into the space they leave behind them, Lucretius meets by maintaining that in this case it would be quite inconceivable that the motion should commence; for where is the water before the fish to go, while the void it is to occupy does not yet exist? So, again, when two bodies start asunder, there must, for an instant, be a void between them. The facts cannot be explained by saying that the air is condensed and then again rarefied, for supposing this were so, it could only happen in case the particles could cohere more closely by filling up the void that previously held them apart.

There is nothing, however, besides the atoms and void. All existing things are either combinations of these two or an 'event of these.' Even time has no separate existence, but is the feeling of a succession of occurrences earlier and later: it has not even so much reality as void space; but the events of history are to be regarded only as accidents of bodies and of space.

These bodies are all either simple—atoms, or 'beginnings,' as Lucretius usually calls them, principia or primordia rerum—or are compound; and if simple, cannot be destroyed by any violence. Infinite divisibility is impossible, for in that case, as things are so much more easily destroyed than they are reconstituted, the process of dissolution in the course of endless time would have proceeded so far, that the restoration of things would have become impossible. It is only because there are limits to the divisibility of matter that things are preserved. Infinite divisibility, moreover, would be incompatible with the laws regulating the production of things, for if they were not composed of minute indestructible particles, then all things might arise without fixed law and order.

This rejection of endless divisibility is the keystone of the doctrine of atoms and void space. After its assertion, then, the poet makes a pause, which is devoted to a polemic against different conceptions of nature, especially against Herakleitos, Empedokles and Anaxagoras.

But we must note his praise of Empedokles, whose close relations to Materialism we have already dwelt upon. After a very lofty poetical eulogy of the island of Sicily, the poet proceeds: "Now though this great country is seen to deserve, in many ways, the wonder of mankind, and is held to be well worth visiting, rich in all good things, guarded by large force of men, yet seems it to have held within it nothing more glorious than this man, and nothing more holy, marvellous, and dear. The verses, too, of his godlike genius cry with a loud voice, and set forth in such wise his glorious discoveries, that he hardly seems born of a mortal stock." [63]

Passing over the polemic, we come to the conclusion of the First Book, a discussion of the constitution of the universe. Here, true as ever to the example of Epikuros, he declines, above all things, to admit definite limits to the world. Let us suppose an extreme limit, and imagine a spear hurled with a strong arm from this limit: will it be stopped by something, or will it continue its course into the infinite? In either case it is clear that we cannot conceive an actual limit to the world.

There is here a singular argument, that if there were fixed limits to the world, all matter must long ago have been collected on the floor of the limited space. Here we find a weak point in Epikuros's whole scheme of nature. He expressly combats the notion of gravitation towards the centre, which had already been accepted by many ancient thinkers. Unfortunately this passage of the Lucretian poem is very much mutilated; yet we may still see the essential features of the argument, and recognise the fallacy

[63] I. v. 726–738:—

"Quae cum magna modis multis miranda videtur
Gentibus humanis regio visendaque fertur,
Rebus opima bonis, multa munita virum vi,
Nil tamen hoc habuisse viro praeclarius in se
Nec sanctum magis et mirum, carumque videtur.
Carmina quinetiam divini pectoris eius
Vociferantur et exponunt praeclara reperta,
Ut vix humana videatur stirpe creatus."

which underlies it. Epikuros there assumes that weight or gravity, as well as resistance, is an essential property of the atoms. On this point the profound thinkers who created the Materialism of antiquity did not succeed altogether in freeing themselves from ordinary notions; for although Epikuros expressly teaches that, strictly speaking, there is in space no above and no below, yet he clings to a determinate direction in the falling of the atoms that make up the universe. To escape from the ordinary notions of weight was, in fact, no easy achievement for the human intellect. The doctrine of the Antipodes, which had developed from the shock inflicted upon the belief in Tartarus, together with the study of astronomy, struggled in vain in antiquity against the ordinary conception of an absolute *above* and *below*. With what reluctance these notions, which are constantly impressed upon us by our senses, yield to scientific abstraction, we may see from another example in modern times,—namely, the doctrine of the revolution of the earth. Even so late as a century after Copernicus, there were scientifically trained and free-thinking astronomers, who advanced their natural feeling of the solidity and fixity of the earth as a proof of the incorrectness of the Copernican system.

Starting, then, from the basis of the gravity of the atoms, the Epikurean system cannot suppose that these have a twofold direction, ceasing in the centre. For since, as everywhere else, so in this centre also, there remains void space between the particles, they cannot support each other. But if we wished to suppose that they had already become compressed in the centre to a certain absolute density by immediate contact, then, according to the theory of Epikuros, already in the infinite duration of time all atoms must have been collected here, and therefore nothing more could happen in the world.

We need not critically demonstrate the weaknesses of this whole manner of thinking.[64] It is much more inter-

[64] It deserves, however, to be remarked, that the theory of Epikuros, viewed from the standpoint of the knowledge and ideas of that time, ad-

esting to the thoughtful observer of human development to see how difficult it was to attain to a correct theory of nature. We wonder at Newton's discovery of the law of gravitation, and scarcely reflect how much progress had to be made in order so far to pave the way for this doctrine that it must inevitably be discovered by some great thinker. When the discovery of Columbus instantaneously placed the old theory of the Antipodes in an entirely new light, and finally disposed of the Epikurean theories on this point, there was involved the necessity of a reform in the whole conception of gravity. Then came Copernicus, then Keppler, then the inquiry into the laws of falling bodies made by Galilei, and so at last everything was ready for the exposition of an entirely new theory.

Towards the end of the First Book Lucretius briefly announces the magnificent doctrine, first proposed by Empedokles, that all the adaptations to be found in the universe, and especially in organic life, is merely a special case of the infinite possibilities of mechanical events.[65]

duces much better reasons in many important points than the Aristotelian theory, and that the latter, more by chance than by force of its proofs, happens to be nearer to our present views. Thus, for example, the whole theory of Aristotle rests upon the conception of a *centre of the universe*, which Lucretius (i. 1070) rightly controverts from the standpoint of the infinity of the universe. In the same way Lucretius has the better conception of motion when he maintains (i. 1074 foll.) that in a void, even though it were the centre of the universe, motion once begun could not be stopped, while Aristotle, starting from his teleological idea of motion, finds in the centre its natural goal. But the superiority is most evident in the argumentation of the Epikurean system to overthrow the natural upward (centrifugal) motion of Aristotle, which is very well refuted by Lucretius (ii. 185 foll.; probably also in the last passage of the first book, according to v. 1094), and referred to upward motion necessitated by the laws of equilibrium and of collision.

[65] Compare above pp. 32–35. The verses (i. 21–34) run thus:—

"Nam certe neque consilio primordia rerum
Ordine se sua quaeque sagaci mente locarunt
Nec quos quaeque darent motus pepigere profecto,
Sed quia multa modis multis mutata per omne
Ex infinito vexantur percita plagis,
Omne genus motus et coetus experiundo
Tandem deveniunt in talis disposituras,
Qualibus haec rerum consistit summa creata,
Et multos etiam magnos servata per annos

If we find any magnificence in the Aristotelian teleology, yet we must none the more refuse this character to the uncompromising denial of the idea of design. We are here dealing with the peculiar keystone of the whole edifice of Materialistic philosophy, a part of the system which has by no means always received its proper share of attention from recent Materialists. If the doctrine of design is one for which we have naturally more sympathy, yet it also contains a larger infusion of human one-sidedness of view. The entire dismissal of what has been imported into our view of things from human narrowness may be repugnant to us, but feeling is not argument; it is at the best but a divining principle, and in face of keen logical consequences is, it may be, an intimation of further possible explanations, which, however, lie beyond, and never before, these consequences.

"For verily not by design did the first beginnings of things station themselves each in its right place, guided by keen-sighted intelligence, nor did they bargain, sooth to say, what motions each should assume, but because many in number, and shifting about in many ways throughout the universe, they are driven and tormented by blows during infinite time past; after trying motions and unions of every kind, at length they fall into arrangements such as those out of which this our sum of things has been formed, and by which too it is preserved through many great years, when once it has been thrown into the appropriate motions, and causes the streams to replenish the greedy sea with copious river-waters, and the earth, fostered by the heat of the sun, to renew its produce, and the race of liv-

> **Ut semel in motus conjectast convenientis,**
> **Efficit ut largis avidum mare fluminis undis**
> **Integrent omnes et solis terra vapore**
> **Fota novet fetus summissaque gens animantum**
> **Floreat et vivant labentes aetheris ignes."**

A more special treatment of the Empedoklean principles, follows in rise of organic existence, according to Book v. 836 foll.

ing things to come up and flourish, and the gliding fires of ether to live." *

To conceive adaptations as only a special case of all conceivable possibilities is as magnificent an idea, as it is an ingenious one to refer the adaptations in this world to the persistence of adaptations. Thus this world, which maintains itself, is merely the one case which, among the innumerable combinations of atoms, must in the course of eternity spontaneously result; and it is only the fact that the very nature of these movements leads to their upon the whole maintaining and constantly renewing themselves that lends to the actual facts of this world the persistency which they enjoy.

In the Second Book Lucretius explains more fully the motion and the properties of the atoms. They are, he declares, in everlasting movement, and this movement is originally a perpetual, equable falling through the boundless infinity of void space.

But here arises a formidable difficulty for the Epikurean system: How is this everlasting and equable descent of the atoms to result in the formation of the world? According to Demokritos the atoms fall with varying degrees of rapidity; the heavy strike against the light, and thus becoming is first occasioned. Epikuros rightly enough refers the various speed with which bodies fall in the air or in water to the resistance of the medium. In this he follows Aristotle, only to take up later a more decided opposition to him. Aristotle not only denies a void, but even the possibility of motion in a void. Epikuros, with a more accurate conception of motion, finds, on the contrary, that motion in a vacuum must be only the more rapid because there is no resistance. But how rapid will it be? Here lies another sunken rock in the system.

In the same way it is suggested that the atoms must move in space with incomparably greater speed than the sun rays which in an instant traverse the space from the

* Lucret., i. 1021–1034, Munro.

sun to the earth.[66] But is this a standard? Have we here any standard whatever of speed? Obviously not; for, in fact, any given space must be traversed in infinitely little time, and as space is absolutely endless, this motion, so long as there are no objects by which it may measure itself, will be quite undeterminate; but the atoms, which move in parallel lines and with equal rapidity, are relatively in complete rest. This consequence of his departure from the view of Demokritos, Epikuros does not seem to have realised to himself with sufficient clearness. Very singular, however, is the expedient he adopts in order to begin the formation of the world.

How came the atoms, which naturally move in a simple course of straight parallel lines, like drops of rain, to attain oblique movements, rapid eddying and innumerable combinations, now inextricably fixed, now releasing themselves, and engaging in new groups with eternal regularity? It must be impossible to fix the time at which they began to deviate from their straight course.[67] The slightest aberration from the parallel lines must, in the course of time, bring about a meeting, a collision of atoms. When this has once occurred, the various forms of the atoms will soon result in the most complicated eddying movements, combinations, and separations. But how did it begin? Here is a fatal gap in the system of Epikuros. Lucretius solves the riddle, or rather cuts the knot, by having recourse to the voluntary movements of men and animals.[68]

[66] Because the sun rays, subtle as they may be, do not consist of single atoms, but of combinations of atoms, and their course lies through a very rare medium, it is true, but by no means through empty space (ii. 150–156). On the other hand, we may say of the atoms that they must fall many times quicker than light (ii. 162–164).

"Et multo citius ferri quam lumina solis,
Multiplexque loci spatium transcurrere eodem
Tempore quo solis pervolgant fulgura coelum."

[67] II. 276 foll.

[68] II. 251–293. It is hard to understand how it can have been supposed that this doctrine of the 'freedom of the will' constitutes a superiority of Lucretius over Epikuros, and a result of his stronger moral character; for, leaving out of view that the point occurs also, of course, in Epikuros, we here find a serious inconsistency with the physical theory, which lends no support whatever to a theory of

Whilst, therefore, it is one of the most important efforts of recent Materialism to deduce the whole mass of voluntary movements from mechanical causes, we find Epikuros adopting a quite incalculable element into his system. True, according to him, most human actions are a consequence of the given movements of the material parts, since one motion regularly occasions another. But here we have not only an obvious and violent break in the causal chain, but there lurks behind a further indistinctness as to the nature of the movement. In the case of a living creature, free will—as we see also in the examples mentioned by Lucretius—quickly works very important results, as with the horse that bursts into the course when the barriers are removed. And yet the origin of this is only an infinitely slight collision of individual atoms of the soul. Here we have at bottom a notion apparently very like that of the doctrine that the earth stands still in the midst of the universe, of which more will be said below.

In these errors Demokritos had probably no share; and yet we shall judge them more leniently if we reflect that, even to our own day, the essence of the doctrine of the freedom of the will, with whatever metaphysical subtlety it is elaborated, consists simply of the uncertainty and perplexity of phenomenal appearances.

In order to account for the apparent stillness of objects whose constituent parts are, nevertheless, in the most constant violent motion, the poet employs the illustration of a grazing flock with merrily skipping lambs, of which we see nothing more from a distance than a white spot on the green hillside.

The atoms are represented by Lucretius as extremely various in form. Now smooth and round, now rough and

moral responsibility. On the contrary, we might almost regard the unconscious arbitrariness with which the soul-atoms decide this way or that, to determine the direction and operation of the will, as a satire upon the *equilibrium arbitrii*, since no image could make it clearer how, by the assumption of such a decision in equilibrium, any intimate connection between the actions of a person and his character is destroyed.

pointed, branched or hook-shaped, they exercise, according to their configuration, a particular influence upon our senses, or upon the properties of the bodies into whose composition they enter. The number of different forms is limited, but there are an unlimited number of each form, and in every body the most various atoms form special relationships with each other; and thus, by means of this combination, as in the combination of letters in words, an incomparably greater variety of bodies is possible than could otherwise result from the different shapes of the atoms.

We cannot forbear from taking an extract from a poetical passage proceeding right from the poet's heart, and which is bound up with a criticism of the mythological conception of nature:—"And if any one thinks proper to call the sea Neptune, and corn Ceres, and chooses rather to misuse the name of Bacchus than to utter the term that belongs to that liquor, let us allow him to declare that the earth is mother of the gods, if he only forbear in earnest to stain his mind with foul religion." [69]

After Lucretius has further explained that colour and the other sensible qualities do not proceed from the atoms themselves, but are only consequences of their operation in particular relations and combinations, he proceeds to the important question of the relation between sensation and matter. The fundamental position is that the sentient is developed out of the non-sentient. This view is limited by the poet to this, that it is not possible for sensation to proceed from *anything* under any circumstances,

[69] II. 655–660 (680):—

"Hic signis mare Neptunum Cereremque vocare
Constituit fruges et Bacchi nomine abuti
Mavolt quam laticis proprium proferre vocamen,
Concedamus ut hic terrarum dictitet orbem
Esse deum matrem, dum vera re tamen ipse
Religione animum turpi contingere parcat."

For the reading, compare Lachmann's "Commentary," p. 112 [or Munro, *in loc*]. The last verse has fallen out of its right place in the MSS., but the correction (which Bernays also adopts) is obvious, since the words "dum vera re tamen ipse" would otherwise only weaken the thought.

but that much depends upon the fineness, shape, motion, and arrangement of matter whether it shall produce the sentient or capable of feeling. Sensation is found only in the organic animal body,[70] and here belongs, not to the parts in themselves, but to the whole.

We have thus reached the point where Materialism, however consistently it may be developed in other respects, always, either more or less avowedly, leaves its own sphere. Obviously with the union into a whole a new metaphysical principle has been introduced, that, by the side of the atoms and void space, appears as a sufficiently striking supplement.

The proof that sensation belongs not to the individual atoms but to the whole is adduced by Lucretius with some humour. It would not be a bad thing, he thinks, if human atoms could laugh and weep, and speak sagely of the composition of things, and ask in their turn what were their original constituent parts. In any case, they must have such in order to be capable of sensation; and then, again, they would no longer be atoms. It is here, of course, overlooked that developed human sensation may also be a whole composed of various lesser sensations through a peculiar combination of influences, but the essential difficulty, nevertheless, remains unsolved. This sensation of the whole can in no case be a mere consequence of any possible functions of the individual, unless the whole also has a certain substantial reality, since out of an otherwise impossible summation of the non-sentiency of the atoms no sensation in the whole can arise.

[70] II. 904 foll.: "Nam sensus jungitur omnis Visceribus nervis venis." The whole passage (a little uncertain in its readings) indicates chiefly the *softness* of these particles, which are therefore specially perishable, and are by no means eternal, or capable, as sentient elements, of propagation from one sentient being to another. Lucretius, however, shows often in the whole passage that they have a special structure, and that the atom of a sentient body has no separate existence, and is therefore incapable in itself of sensation. The poet here too comes tolerably near to the Aristotelian notion of organisms, and we have no reason to doubt that this was the doctrine of Epikuros. (Comp. 912 sqq.: "Nec manus a nobis potis est secreta neque ulla Corporis omnino sensum pars sola tenere.")

The organic whole is, then, a wholly new principle by the side of the atoms and the void, though it may not be so recognised.

The conclusion of the Second Book consists of a bold and magnificent corollary from the views thus far propounded: the theory of the ancient Materialists of the infinite number of worlds which, at enormous periods and distances, arise near, above, and below each other, last for a day and then are again dissolved.

Far beyond the limits of our visible universe there exist on all sides innumerable atoms not yet formed into bodies, or that have been for endless ages dispersed again, which pursue their quiet fall through spaces and times which no man can measure. But as in every direction through the vast whole the same conditions exist, the phenomena also must repeat themselves. So that above us, below us, beside us, exist worlds in an innumerable host; and if we consider these, all idea of a divine government of the whole must disappear. All these are subject to the processes of becoming and passing away; since they at one time are constantly attracting new atoms from the infinite space, and at another, through the separation of the parts, undergo ever-growing losses. Our earth soon grows old. The aged peasant shakes his head with a sigh, and ascribes to the piety of our ancestors the better fruits of earlier times, which have been more and more corrupted for us by the decay of our world.

In the Third Book of his poem, Lucretius summons all the forces of his philosophy and of his poetry to controvert the existence of the soul, and to refute the doctrine of immortality, and he starts by trying to get rid of the fear of death. To this terror, which poisons every pure pleasure, the poet ascribes a large share of those passions which drive a man to sin. Poverty seems to those whose hearts are not lightened by the truth to be the gate of death. That he may fly from death man heaps up for himself riches by the vilest sins; nay, the fear

of death can so far blind us that we seek that from which we fly; it may even drive us to suicide, since it makes life intolerable.

Lucretius distinguishes soul (*anima*) and spirit (*animus*): both he explains to be closely united parts of man. As hand, foot, eye, are organs of the living being, so also is the spirit. He rejects the view that makes the soul consist only in the harmony of the whole physical life. The warmth and the breath which leave the body at death are formed by the soul; and the finest inmost portion of it, which is situated in the breast, and alone possesses sensation, is the spirit; both are corporeal, and are composed of the smallest, roundest, and most mobile atoms.

If the bouquet of wine disappears, or the perfume of an unguent is dissipated into the air, we observe no loss of weight; just so is it with the body when the soul has disappeared.

The difficulty which here again suggests itself of fixing the exact seat of sensation is in the most important point completely evaded by the Epikurean system, and in spite of the immense progress of physiology, the Materialism of the last century found itself at precisely the same point. The individual atoms do not feel, or their feelings could not be fused together, since void space which has no substratum cannot conduct sensation, and still less partake of it. We must therefore constantly fall back on the solution—the motion of the atoms is sensation.

Epikuros, and with him Lucretius, in vain seek to veil this point by saying that, besides the subtle atoms of air, vapour, and heat, of which the soul is supposed to consist, there is still a fourth constituent associated with them, wholly without name, and of the utmost fineness and mobility, which forms the soul of the soul.[71] But with

[71] In another aspect, of course, the supposition of this unnamed extremely subtle matter appears to have a carefully considered value; that is, in connection with a great deficiency of the theory of motion. Epikuros appears to have supposed—in sharp contrast with our theory of the conservation of force—that a subtle body may pass on its own movement

regard to these subtlest soul-atoms, the difficulty still remains the same, as it also does for the vibrating brain-filaments of De la Mettrie.

How can the motion of a body, in itself non-sentient, be sensation? Who is it, then, that feels? How does the sensation come about? Where? To these questions Lucretius gives us no answer. Later we shall perhaps meet them again.

An extended refutation of any possible form of the theory of immortality constitutes an important section of the book. We see what stress the poet laid upon this point, since the conclusion is already fully contained in what has preceded. The sum of the whole argument is to show that death is indifferent to us, because when it appears upon the scene there is no longer a subject capable of feeling any evil.

In his fear of death, says the poet, man has, in looking upon the body which decays in the grave, or is destroyed by the flames, or is torn by beasts of prey, ever a secret relic of the idea that he himself must suffer this. Even where he denies this idea he yet nurses it, nor does he "separate himself from that self, nor withdraw himself from the body so thrown out." And so he overlooks the fact that when he really dies he cannot have a duplicate existence, only to torture himself with such a fate. "Now no more shall thy house admit thee with glad welcome, nor a most virtuous wife and sweet children run to be the first to snatch kisses, and touch thy heart with a silent joy. No more mayst thou be prosperous in thy doings, a safeguard to thine own" — so they complain— "one disastrous day has taken from thee, luckless

to a heavier, independently of the bulk, and this in turn to a still heavier; so that the sum of mechanical work done, instead of remaining stationary, goes on multiplying from step to step. Lucretius describes this gradual rise iii. 246 foll.; that first the sentient (and will-endowed: comp. ii. 251–93) element moves the caloric, this then in turn the breath of life, this the air mingled with the soul, this the blood, and the blood at length the solid parts of the body.

man, in luckless wise, all the many prizes of life." But they forget to add—"And now no longer does any craving for these things beset thee withal." If they would but rightly apprehend this, they would deliver themselves from great distress and fear. "Thou, even as now thou art, sunk in the sleep of death, shalt continue so to be all time to come, and freed from all distressful pains; but we, with a sorrow that would not be sated, wept for thee when close by thou didst turn to ashes on thy appalling funeral pile, and no length of days shall pluck from our hearts our ever-during grief." When any one so speaks, we must ask him what is there in it so passing bitter, if it come in the end to sleep and rest, that any one should pine in never-ending sorrow?

The whole conclusion of the Third Book, from the passage here quoted, contains much that is admirable and remarkable. Nature itself is made to speak, and proves to the man the vanity of his fear of death. Very beautifully also the poet employs the terrible myths of the lower world, which are all transferred to human life and its pains and passions. One might often fancy one's self listening to a Rationalist of the last century, except that we are in the sphere of classical ideas.

It is not that Tantalus in the lower world feels a vain terror of the rock that threatens his head, but that mortal men are so tormented in life by fear of God and death. Our Tityos is not the giant of the under world, who covers nine acres as he lies stretched, and is eternally torn by vultures, but every one who is eaten up by the torments of love or of any other desire. The ambitious man, striving after high office in the state, rolls, like Sisyphos, the huge stone up the mountain, which will straightway roll down again to earth. The grim Cerberus and all the terrors of Tartarus typify the punishments that the transgressor has to fear; since though he escape prison and the ignominy of execution, his conscience must yet punish him with all the terrors of justice.

Heroes and kings, great poets and sages, have died, and men whose life has far less value think it a grievance that they must die. And yet their whole life is spent in tormenting dreams and useless anxieties; they find the cause of their unhappiness now in this thing and again in that, and do not know what they really lack. If they knew this, they would neglect all else, and devote themselves to the study of nature, since it is a question of the state in which man will continue to be for ever after the termination of this life.

The Fourth Book contains the special anthropology. It would lead us too far were we to introduce the numerous and often surprising observations upon which the poet builds his doctrines. These doctrines are those of Epikuros; and as we are concerned not so much with the first beginnings of physiological hypotheses as with the development of important principles, the little we have already recounted of the Epikurean theory of the sensations will suffice.

The conclusion of the book consists of an extended discussion of love and the relations of the sexes. Neither the ordinary notions of the Epikurean system which possess one's mind, nor the brilliant poetical invocation of Venus at the beginning of the poem, lead one to expect the seriousness and impressiveness which the poet here displays. He deals with his theme from a purely physical point of view, and in seeking to explain the development of the sexual impulse, he treats it from the beginning as an evil.

The Fifth Book is devoted to the more special exposition of the development of all that is—of earth and sea, of the stars, and of living beings. Very peculiar is the passage about the stationariness of the earth in the middle of the universe.

The cause assigned for this is the inseparable connection of the earth with atmospheric atoms, which are spread under it, and which are not compressed by it, just because

they are from the beginning in firm union with it. That a certain want of clearness lies at the bottom of this notion we will admit; moreover, the comparison with the human body, which is not burdened by its own members, and is borne about and moved by the fine gaseous particles of the soul, does not help to bring the conception home to us. Yet we must observe that the idea of an absolute rest of the earth lies as far from the poet as it would be obviously inconsistent with the whole system. The universe must, like all the atoms, be conceived as falling, and it is only surprising that the free deviation downwards of the gaseous atoms beneath the earth is not employed as a solution.[72]

Of course, if Epikuros or his school had fully explained the relations of rest and motion, they would have been many centuries ahead of their time.

The tendency to explain the universe by the possible instead of the actual we have already learnt to know in the case of Epikuros. Lucretius expresses it with such precision, that, taking it in connection with the traditions of Diogenes Laertius, we must come to the conclusion that on this point we have before us not indifference or superficiality, as many suppose, but a determinate, and, as far as

[72] The matter is differently conceived by Zeller (iii. 1, p. 382, E. T. = Reichel, Stoics, &c., 425), who maintains, indeed, that the consistency of the system would require a falling of the worlds (and therefore a *relative* motionlessness of the earth as compared with our universe), but without supposing that Epikuros drew this conclusion. It is not correct, however, to say that in this falling process the world must very soon come into collision. Such an accident is much more likely to happen only after a long time, considering the immense distances which must be supposed to exist between the individual worlds. A catastrophe of the worlds by a collision is expressly admitted by Lucretius (v. 366–372) to be possible, whilst destruction by many smaller collisions from the outside is at the same time enumerated as one of the natural causes for the death of the ageing world. As to the manner in which the earth is kept suspended by constant collisions of subtle atmospheric atoms, here again the above-mentioned (note 71) peculiarity of the Epikurean theory of motion seems to underly it, according to which the mechanical influence of impact (as expressed in our language) multiplies itself in the transition from subtler to heavier particles.

is possible with such a foundation, an exact method of the Epikurean school.[73]

On the occasion of the question as to the causes of the motions of the stars the poet says:

"For which of these causes is in operation in this world, it is not easy to affirm for certain; but what can be and is done throughout the universe in various worlds formed on various plans, that I teach; and I go on to set forth several causes which may exist throughout the universe for the motions of stars; one of which, however, must in this world also be the cause that imparts lively motion to the signs; but to dictate which of them it is, is by no means the duty of the man who advances step by step."[74]

The idea that the entire series of possibilities is in the infinity of worlds somewhere in actual existence, is in complete accordance with the system; to make the sum of the conceivable correspond to that of the actually possible, and therefore the actually existing in some of the infinitely numerous worlds, is a thought which even to-day may throw a useful cross-light upon the favourite doctrine of the identity of Existence and Thought. Whilst

[73] Obviously, of course, there is here no question of an exact scientific, but only of an exact philosophical, method. Further details on this point will be found in the Neue Beitr. z. Gesch. d. Materialismus Winterthur, 1867, p. 17 foll. It is interesting that recently a Frenchman (A. Blanqui, 'L'Eternité par les Astres, Hypothèse astronomique,' Paris, 1872), has carried out again, quite seriously, the idea that everything possible is somewhere and at some time realised in the universe, and, in fact, has often been realised, and that as an inevitable consequence, on the one hand, of the absolute infinity of the universe, but on the other of the finite and everywhere constant number of the elements, whose possible combinations must also be finite. This last also is an idea of Epikuros (comp. Lucretius, ii. 480–521).

[74] This passage is v. 527–533:—

"Nam quid in hoc mundo sit eorum ponere certum
Difficile est: sed quid possit fiatque per omne
In variis mundis, varia ratione creatis,
Id doceo, plurisque sequor disponere causas,
Motibus astrorum, quae possuit esse per omne;
E quibus una tamen siet haec quoque causa necessest
Quae vegeat motum signis: sed quae sit earum
Praecipere haut quaquamst pedetentim progredientis."

Compare with this Epikuros's letter to Empedokles, Diog. Laert., x. 87 foll.

the Epikurean nature-study directs itself to the sum of the conceivable, and not to certain detached possibilities, it passes on also to the sum of the actually existing; only that in the decision as to what is in our particular case, the sceptical ἐπέχειν seizes upon a place and covers an expression which goes further than our real knowledge. With this profound and cautious method, however, the theory of the greater probability of a particular explanation admirably harmonises; and we have, as a matter of fact, many traces of such a preference of the most plausible explanation.

Amongst the most important portions of the whole work we may reckon those sections of the Fifth Book which treat of the gradual development of the human race. With justice, observes Zeller—who is in other respects not entirely fair to Epikuros—that his philosophy established very sound views upon these questions.

Mankind were much stronger in the primeval times, according to Lucretius, than they now are, and had immense bones and strong sinews. Hardened against frost and heat, they lived, like the animals, without any agricultural arts. The fruitful soil offered them spontaneously the means of life, and they quenched their thirst in streams and springs. They dwelt in forests and caves without morality or law. The use of fire, and even a clothing of skins, were unknown. In their contests with the wild animals they generally conquered, and were pursued by few only. Gradually they learnt to build huts, to prepare the soil for crops, and the use of fire; the ties of family life were formed, and men began to grow more gentle. Friendship grew up between neighbours, mercy to women and children was introduced, and though perfect harmony might not yet reign, yet for the most part men lived in peace with one another.

The manifold sounds of speech were struck out by men at the bidding of nature, and their application formed the names of things, very much as their early development

leads children to the employment of language, making them point out with their finger what is before them. As the kid feels its horns and tries to butt with them before they are grown up, as the young panthers and lions defend themselves with their claws and mouth although their talons and teeth are scarcely come, as we see birds early trusting themselves upon their wings, so is it with men in the case of speech. It is, therefore, absurd to believe that some one once gave things their names, and that men had thence learned the first words; for why should one suppose that this one man could utter distinctive sounds, and produce the various tones of language, although, at the same time, the others could not do this? and how could this guide and influence the rest to use sounds whose use and meaning were quite unknown to them?

Even the animals utter entirely different sounds when they are in fear, in pain, and in joy. The Molossian hound, which growls and shows its teeth, barks loudly or plays with its young ones, howls when its master leaves it in the house, or whines as it runs from a blow, utters spontaneously the most different tones. And the same thing is true of other animals. How much more, then, concludes the poet, must we suppose that men in primeval times could indicate the various objects by constantly varying sounds.

In the same way he treats the gradual development of the arts. Lucretius admits the force of sentiments and discoveries, but, in strict fidelity to his theory, he assigns the most important share to the more or less unconscious effort. Only after exhausting many false paths did man attain the right, which then maintains itself by its obvious worth. Spinning and weaving were first invented by men, and only later turned over to women, while men applied themselves again to more difficult labours.

In our own day, when the industry of women, step by step—sometimes even with a leap—is forcing its way into

vocations devised and hitherto exclusively pursued by men, this thought is much more pertinent than in the times of Epikuros and Lucretius, when such transferences of whole professions, so far as we know, did not occur.

And thus into the structure of these historico-philosophical considerations are woven also the thoughts of the poet as to the formation of political and religious arrangements. Lucretius thinks that the men who were distinguished by their talents and their courage began to found cities and build themselves castles, and then as kings shared their lands and goods at their will among the handsomest, strongest, and cleverest of their adherents. Only later, when gold had been found, were those economic conditions produced which soon enabled riches to exalt themselves above might and beauty. But wealth also gains adherents, and allies itself with ambition. Gradually many strive for power and influence. Envy undermines power, kings are overthrown, and the more their sceptre was before dreaded, the more eagerly is it trodden in the dust. Now the rude mob is for some time supreme, until, from an interregnum of anarchy and transition, law and order are developed.

The remarks here and there interwoven bear that character of resignation and of the dislike of political activity which was, generally speaking, characteristic of ancient Materialism. As Lucretius preaches frugality and contentment in place of the chase after wealth, so he is of opinion that it is far better quietly (*quietus!*) to obey, than to wish to exercise mastery over affairs, and to maintain the form of monarchy. We see that the idea of the old civic virtue and genuine republican community of self-government has disappeared. The praise of passive obedience is equivalent to denying the state to be a moral community.

This exclusive assertion of the standpoint of the individual has been unjustly brought into too close connection with the Atomism of the nature-theory. Even the Stoics, whose whole system in other respects brought politics

into near relation with moral action, turned with especial distinctness in later times from public business: on the other hand, the community of the wise, which the Stoics ranked so high, is represented among the Epikureans in the narrower and more exclusive form of friendship.

It is much more the exhaustion of the political energy of the peoples of antiquity, the disappearance of freedom, and the rottenness and hopelessness of the political condition of things, that drives the philosophers of this period into quietism.

Religion is traced by Lucretius to sources that were originally pure. Waking, and still more in dreams, men beheld in spirit the noble and mighty figures of the gods, and assigned to these pictures of fancy, life, sensation, and superhuman powers. But, at the same time, they observed the regular change of the seasons, and the risings and settings of the stars. Since they did not know the reason of these things, they transferred the gods into the sky, the abode of light, and ascribed to them, along with all the celestial phenomena, storm also and hail, the lightning flash, and the growling, threatening thunder.

"O hapless race of men, when that they charged the gods with such acts, and coupled with them bitter wrath! What groanings did they then beget for themselves, what wounds for us, what tears for our children's children!" [75]

At some length the poet describes how easy it was for man, when he beheld the terrors of the sky, instead of the quiet contemplation of things which is the only real piety, to appease the supposed anger of the gods by sacrifice and vows, which yet avail nothing.

The last Book of the poem treats, if I may use the expression, of pathology. Here are explained the causes of the heavenly appearances; lightning and thunder, hail and clouds, the overflowing of the Nile and the eruptions of Ætna are discussed. But, as in the previous Book the early history of mankind forms but a part of the cos-

[75] Lib. v. 1194–1197.

mogony; so here the diseases of man are interpolated among the wonderful phenomena of the universe, and the whole work is concluded by a deservedly famous description of the plague. Perhaps the poet intentionally finishes his work with an affecting picture of the might of death, as he had begun it with an invocation to the goddess of springing life.

Of the more special contents of the Sixth Book, we will only mention the lengthy account of the 'Avernian spots,' and of the phenomena of the loadstone. The former especially challenged the rationalising tendency of the poet, the latter offered a special difficulty to his explanation of nature, which he attempts to overcome by a very careful and involved hypothesis.

'Avernian spots' was the name given by the ancients to such places in the ground as are not seldom found in Italy, Greece, and Asia Minor, in which the ground gives vent to gases which produce stupefaction or death in men and animals. The popular belief naturally supposed that there was a connection between these places and the lower world, the realm of the god of death, and explained the fatal influence by the uprising of spirits and demons of the shadowy realm, who try to drag down with them the souls of the living. The poet then attempts to show, from the various nature of the atoms, how they must be either beneficial or hurtful to different creatures, some to one kind and some to another. He then examines the case of many kinds of poisons, which spread imperceptibly, and mentions, in addition to some superstitious notions, the cases of metal-poisoning by working in mines, and, what is most pertinent to his problem, the fatal action of carbonic vapours. Of course he attributes this, since the ancients were not acquainted with carbonic acid, to malodorous sulphurous vapours. The rightness of his conclusion to a poisoning of the air by exhalations from the ground in these places may well supply a proof how an orderly and analogical study of nature, even without the application of

more stringent methods, must lead to great advances in knowledge.

The explanation of the operation of the magnet, inadequate as it may otherwise be, affords us a view of the exact and consequent carrying out of hypotheses which is characteristic of the whole natural philosophy of the Epikureans. Lucretius reminds us, to begin with, of the continual extremely rapid and tempestuous motions of the subtle atoms which circulate in the pores of all bodies, and stream out from their surfaces. Every body, on this view, is always sending out in every direction streams of such atoms, which produce a ceaseless interchange amongst all the objects in space. It is a theory of universal emanation as against the vibration theory of modern physical science. The relations of these interchanges in themselves, apart from their form, have been in our own days not only demonstrated by experiment, but have had an incomparably greater importance assigned to them in their kind, quantity, and rapidity than the boldest imaginations of the Epikureans could have conceived.

Lucretius tells us that from the magnet there proceeds such a violent stream outwards, that it produces through the driving out of the air a vacuum between the magnet and the iron, into which the iron rushes. That there is no idea here of a mystically acting '*horror vacui*' is, of course, obvious, if we consider the physical philosophy of this school. The result is rather produced because every body is constantly assailed on every hand by blows from atmospheric atoms, and must therefore yield in any direction in which a passage opens itself, unless its weight is too great, or its density is so slight that the air-atoms can make their way unhindered through the pores of the body. And this explains why it is iron of all things that is so violently attracted by the magnet. The poem refers it simply to its structure and its specific gravity; other bodies being partly too heavy, as in the case of gold, to be moved by the streams, and so carried through the void space to the mag-

not, and partly, as in the case of wood, so porous, that the streams can fly through them freely without any mechanical collision.

This explanation leaves much still unexplained, but the whole treatment of the subject advantageously contrasts with the hypotheses and theories of the Aristotelian school by its vividness and clearness. We first ask, how is it possible that the currents from the magnet can expel the air without repelling the iron by the same force?[1] And it might have been readily ascertained by an easy experiment that into the void created by rarefied air, not iron alone, but all other bodies, are carried. But the fact that we can raise such objections shows that the attempt at an explanation is a fruitful one, whilst the assumption of secret forces, specific sympathies, and similar devices, is hostile to all further reflection.

This example also shows us, it is true, why this fashion of natural inquiry could make so little progress in antiquity. Almost all the real achievements of physical science among the ancients are mathematical, and therefore in astronomy, in statics and mechanics, and in the rudiments of optics and acoustics. There was further a valuable mass of materials accumulated by the descriptive sciences; but everywhere, where what was needed was the attainment by the variation and combination of observations to the discovery of laws, the ancients remained in a backward condition. To the Idealist was lacking the sense for and interest in concrete phenomena; the Materialists were always too much inclined to stop short with the individual view, and to content themselves with the first explanation that offered itself, instead of probing the matter to the bottom.

[1] We may compare the well-known experiment in which a plate which is held over the opening of a vessel through which a stream of air is flowing, is attracted and held fast because the air, which streams rapidly sidewards, is rarefied between the vessel and the plate (Müller's Physik, i. p. 20). Even though we cannot assume that the Epicureans were acquainted with this phenomenon, yet they may have conceived in a similar way the expulsion of the air by the currents proceeding from the stone.

SECOND SECTION.

THE PERIOD OF TRANSITION.

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CHAPTER I.

THE MONOTHEISTIC RELIGIONS IN THEIR RELATION TO MATERIALISM.

THE disappearance of the ancient civilisation in the early centuries of the Christian era is an event the serious problems of which are in great part still unexplained.

It is difficult enough to follow the intricate events of the Roman Empire in all their extent, and to grasp the important facts; but it is incomparably more difficult to estimate in their full extent the workings of the slight but endlessly multiplied changes in the daily intercourse of nations, in the hearts of the lower orders, by the hearth of humble families, whether in the city or the countryside.[1]

And yet, so much at least is certain, that from the lower

[1] A very valuable insight into the physiology of nations has been recently afforded us by the consideration of history from the standpoints of the *natural sciences* and of *political economy*, and the light thus kindled extends into the poorest hovels; yet it shows us only one side of the matter, and the changes in the *intellectual* condition of peoples remain still covered with darkness, so far as they cannot be explained from the social changes. Liebig's theory of the exhaustion of the soil has been carried by Carey (Principles of Social Science, vol. i. chaps. iii. ix., vol. iii. chap. xlvi., &c.) to wrong and exaggerated conclusions, and been fused with entirely absurd doctrines (comp. my essay, Mill's Ansichten über die sociale Frage u. d. angebl. Umwälzung der Socialwissensch. durch Carey, Duisb. 1866), but the correctness of this theory in its main features, and its applicability to the civilisation of the old world, cannot be doubted.

and middle strata of the population alone is this mighty revolution to be explained.

We have, unhappily, been accustomed to regard the so-called law which governs the development of philosophy as a peculiar mysteriously working force, which necessarily leads us from the sunlight of knowledge back into the night of superstition, only to begin its course again

The corn-exporting provinces must have gradually become poor and depopulated, while around Rome, and likewise about the subordinate centres, wealth and population led to the most forced system of agriculture, in which heavily-manured and carefully cultivated little gardens produced richer results in fruit, flowers, &c., than extensive holdings in distant neighbourhoods. (Comp. Roscher, Nationalökon. des Ackerbaus, § 46, where it is said, *inter alia*, that single, fruit-trees in the vicinity of Rome produced as much as £15 yearly, while wheat in Italy for the most part produced only fourfold, because only inferior soils were devoted to the growing of wheat.) But the whole concentrated economy of the rich commercial centre is not only more sensitive to blows from without than the economy of a country in more moderate circumstances, but it is also dependent upon the productiveness of the circle which delivers to the centre the indispensable necessaries of life. The devastation of a fertile country by war, even though it is accompanied by a decimation of its inhabitants, is speedily compensated by the efforts of nature and of man; while a blow inflicted upon the capital, especially if the resources of the provinces are already diminishing, very easily produces complete ruin, because it hampers the entire system of commercial exchange at its centre, and so suddenly annihilates the exaggerated values enjoyed and created by luxury. But even without such blows from without, the fall must have come with increasing acceleration, as soon as the pauperisation and depopulation of the provinces was so far gone that, even by means of increased pressure, their contributions could no longer be kept up to their standard. The whole picture of this process would, so far as the Roman Empire is concerned, be much more clearly displayed to us, but that the advantages of a magnificent and powerfully maintained centralising process among the great emperors of the second century counterbalanced the evil, and, in fact, evoked a new period of material splendour at the very brink of the general downfall. It is upon this last brilliant display of the ancient civilisation, the benefits of which fell, of course, for the most part, to the towns and to certain favoured tracts of country, that the favourable picture chiefly rests which Gibbon draws of the condition of the Empire in the first chapter of the "History of the Decline and Fall of the Roman Empire." It is evident, however, that the economic evil to which the Empire must ultimately succumb had already attained a serious development. A splendour which rests upon the accumulation and concentration of riches can very easily reach its climax if the means of accumulation are already beginning to disappear, just as the greatest heat of the day occurs when the sun is already setting.

Much earlier must the moral ruin appear in this great process of centralisation, because the subjection and fusion of numerous and utterly dif-

from thence under newer and higher forms. It is with this impulse of national development as it is with the life-force of organisms. It is there—but there only as the resultant of all the natural forces. To assume it frequently helps our observations; but it veils their uncertainty, and leads to errors if we set it down as a complementary explanation

ferent peoples and races brings confusion not only into the specific forms of morality, but also into its very principles. Lecky shows quite rightly (History of European Morals from Augustus to Charlemagne, 1869, vol. i. p. 271 foll.) how the Roman virtue, so intimately fused with the local patriotism of the early Romans and the native religion, must inevitably perish through the destruction of the old political forms, and the rise of scepticism and introduction of foreign cults. That the progress of civilisation did not substitute new and superior virtues—"gentler manners and enlarged benevolence"—in place of the old ones, is attributed to three causes: the Empire, slavery, and the gladiatorial games. Does this not involve a confusion of cause and effect? Compare the admirable contrast just before drawn by Lecky himself between the noble sentiments of the Emperor Marcus Aurelius and the character of the masses over whom he ruled. The individual can raise himself with the help of philosophy to ethical principles which are independent of religion and politics; the masses of the people found morality—and that still more in antiquity than in our own days—only in the connection, which had been taught in local traditions, and had become inseparable, of the general and the individual, of the permanently valid and the variable; and accordingly the great centralisation of the world-empire must in this sphere have exercised everywhere, alike amongst conquerors and conquered, a dissolving and disturbing influence. Where, however, is the "normal condition of society" (Lecky, *loc. cit.*, p. 271) which could forthwith replace by new ones the virtues of the perishing social order? Time, above all things, and, as a rule, also the appearance of a new type of people, are needed for the fusion of moral principles with sensational elements and fanciful additions. And so the same process of accumulation and concentration which developed the ancient civilisation to its utmost point appears also as the cause of its fall. In fact, the peculiarly enthusiastic feature of the fermenting process from which mediæval Christianity finally proceeded seems to find its explanation here; for it distinctly points to an overstraining of the nervous system by the extremes of luxury and abstinence, voluptuousness and suffering, extending through all classes of the population; and this condition, again, is merely a consequence of the accumulation of wealth, although, indeed, slavery lends to its consequences a specially disagreeable colouring. For the facts as to the accumulation in ancient Rome, see Roscher, Grundl. der National-ökon. § 204, and especially Anm. 10; for the senseless luxury of decaying nations, *ibid.*, § 233 ff., as well as the essay on luxury in Roscher's 'Ansichten der Volkswirthschaft aus geschichtl. Standpunkte.' The influence of slavery has been specially pointed out by Contzen, Die Sociale Frage, ihre Geschichte; Literatur u. Bedeut. in d. Gegenw., 2te Aufl., Leipzig, 1872. Compare also the following note.

by the side of those elements with the sum of which it is really identical.

For our purpose it is well to keep in mind that ignorance cannot be the proper consequence of knowledge, or fantastic caprice the consequence of method; that rationalism does not, and never can of itself, lead us back to superstition. We have seen how in antiquity, amidst the progress of rationalism, of knowledge, of method, the intellectual aristocracy broke away from the masses. The lack of a thorough popular education must have hastened and intensified this separation. Slavery, which was in a sense the basis of the whole civilisation of antiquity, changed its character in imperial times, and became only the more untenable because of the efforts that were made to ameliorate this dangerous institution.[2]

The increasing intercourse of nations began to produce amongst the superstitious masses a confusion of religions. Oriental mysticism veiled itself in Hellenic forms. At

[2] Gibbon, Hist. of the Decline, &c., chap. ii., describes how the slaves, who had become comparatively cheaper since the Roman conquests, rose in value, and were better treated in consequence, with the falling off in the importation of prisoners of war, who in the times of the wars of conquest had often been sold by thousands at a very cheap rate. It became more and more necessary to breed slaves at home, and to promote marriages amongst them. By this means the whole mass, which had previously on every estate, often with the most careful calculation (see the letters of Cato in Contzen, *loc. cit.*, S. 174), been composed of as many different nationalities as possible, became more homogeneous. To this was added the enormous accumulation of slaves on the large estates and in the palaces of the rich; and again, too, the important part played by the *freedmen* in the social life of imperial times. Lecky, *loc. cit.*, i. 318, rightly distinguishes three periods in the position of the slaves: the earliest, in which they were a part of the family, and were comparatively well treated; the second, in which their numbers were very largely increased, while their treatment grew worse; and finally, the third, which begins with the turning-points indicated by Gibbon. Lecky specially points out, too, the influence of the Stoic philosophy in the milder treatment of the slaves.

Slavery no longer reacted in this third period upon the civilisation of the ancient world by means of the dread of great servile wars, but did so, of course, by the influence which the subject class more and more exercised on the whole modes of thought of the population. This influence, one diametrically opposed to the ancient ideals, became especially marked with the spread of Christianity. Comp. as to this Lecky, Hist. Eur. Morals, ii. 66 foll.

Rome, whither the conquered nations flocked, there was soon no creed that did not find believers, while there was none that was not scoffed at by the majority. To the fanaticism of the deluded multitude was opposed either a light-hearted contempt or a blasé indifference: the formation of sharp, well-disciplined parties, amidst the universal division of interests among the higher classes, had become impossible.

To such an extent there forced a way through the incredible growth of literature, through the desultory studies of officious spirits, through daily intercourse, disjected fragments of scientific discoveries, and produced that state of semi-culture which has been declared, perhaps with less reason, to characterise our own days. We must not, however, forget that this semi-culture was chiefly the condition of the rich and powerful, of the men of influence up to the imperial throne. The fullest social training, elegant social traits in wide command of affairs, are, in a philosophical sense, only too often united with the most pitiable deficiencies, and the dangers which are attributed to the doctrines of philosophers tend to become only too real in those circles where the flexible, unprincipled semi-culture is a slave of natural inclinations or disordered passions.

When Epikuros, with a lofty enthusiasm, flung away the fetters of religion, that he might be righteous and noble, because it was a delight to be so, there came these profligate favourites of the moment, as they are pictured in rich variety by Horace and Juvenal and Petronius, who, with shameless front, rushed into the most unnatural forms of vice; and who was there to protect poor Philosophy when such reprobates claimed the name of Epikuros, if indeed they did not claim that of the Porch?

Contempt of the popular belief was here assumed as a mask for inner hollowness, utter absence of belief and true knowledge. To smile at the idea of immortality was a sign of vice; but the vice was due to the circumstances of the time, and had arisen not through, but in spite of philosophy.

And in these very classes the priests of Isis, the thaumaturgists, and prophets, with their train of jugglery, found a rich harvest; nay, sometimes even the Jews found a proselyte. The utterly uneducated mob shared in the towns the character of characterlessness with the great in their semi-culture. Thence ensued, then, in those times, in the fullest bloom, that practical Materialism, as it may be called—Materialism of life.

On this point also the prevailing notions require an explanation. There is also a Materialism of life which, reviled by some, prized by others, may, by the side of any other practical tendency, still venture to show its face.[3]

When effort is directed not to transitory enjoyment, but to a real perfecting of our condition; when the energy of material enterprise is guided by a clear calculation, which in all things has ultimate principles in view, and therefore reaches its aim; then there ensues that giant progress which in our own time has made England in two hundred years a mighty people, which in the Athens of Perikles went hand in hand with the highest blossom of intellectual life which any state has ever attained.

But of quite another character was the Materialism of Imperial Rome, which repeated itself at Byzantium, Alexandria, and in all the capitals of the Empire. Here also the search for money dominated the distracted multitudes, as we see in the trenchant pictures of Juvenal and Horace; but there were lacking the great principles of the elevation

[3] Mommsén, History of Rome, E. T., iv. 560 (chap. xii.), observes: "Unbelief and superstition, different hues of the same historical phenomenon, went in the Roman world of that day hand in hand, and there was no lack of individuals who themselves combined both—who denied the gods with Epikuros, and yet prayed and sacrificed before every shrine." In the same chapter are some details as to the introduction of Oriental religions into Rome. "When the Senate (in 50 B.C.) ordered the temples of Isis constructed within the ring-wall to be pulled down, no labourer ventured to lay the first hand on them, and the consul Lucius Paullus was himself obliged to apply the first stroke of the axe. A wager might be laid that the more lax any woman was, the more piously she worshipped Isis." Compare further Lecky, Hist. Eur. Morals, i. 338 foll.

of national power, of the utilisation for the common advantage of national resources, which ennoble a Materialistic tendency, because, though they start from matter, yet they leaven it with force. This would result in the Materialism of prosperity: Rome knew that of decay. Philosophy is compatible with the first, as with all that has principles; she disappears, or has rather already disappeared, when those horrors break in of which we will here forbear to say anything.

Yet we must point out the undeniable fact, that, in the centuries when the abominations of a Nero, a Caligula, or even of a Heliogabalus, polluted the globe, no philosophy was more neglected, none was more foreign to the spirit of the time, than that of all which demanded the coldest blood, the calmest contemplation, the most sober and purely prosaic inquiry—the philosophy of Demokritos and Epikuros.

The age of Perikles was the blossoming-time of the materialistic and sensationalistic philosophy of antiquity: its fruits ripened in the time of Alexandrian learning, in the two centuries immediately before Christ.[4]

But as the masses under the Empire were drunk with the double intoxication of vice and of the mysteries, no sober disciple was to be found, and philosophy died out. In those times, as everybody knows, prevailed Neo-Platonic and Neo-Pythagorean systems, in which many nobler elements of the past were overpowered by fanaticism and Oriental mysticism. Plotinus was ashamed that he had a body, and would never name his parents. Here we have already in philosophy the height of the anti-Materialistic tendency—an element that was still mightier in the field

[4] It is therefore at once unfair and inaccurate when Draper, in his in many respects valuable "History of the Intellectual Development of Europe," identifies Epikureanism with the hypocritical infidelity of the men of the world, to whom "society is indebted for more than half its corruptions" (vol. i. pp. 168, 169). Independent as Draper shows himself in his final judgments and his whole mode of thought, there nevertheless appears in his account of Epikuros, and perhaps still more in the way in which he makes Aristotle an experience-philosopher, the obvious influence of erroneous traditions.

to which it properly belonged—that of Religion. Never have religions flourished with such wild luxuriance and in such wide variety, from the purest to the most abominable shapes, as in the three first centuries after Christ. No wonder, then, that even the philosophers of this time often appeared as priests and apostles. Stoicism, whose doctrine had naturally a theological turn, first yielded to this tendency, and was therefore the longest respected of the older schools, till it was outbid and supplanted by the ascetic mysteries of Neo-Platonism.[5]

It has been often said that incredulity and superstition further and excite each other; yet we must not allow ourselves to be dazzled by the antithesis. Only by weighing the specific causes and by the severe discrimination of time and circumstance can we see how far it is true.

When a rigorously scientific system, resting upon solid principles, on well-considered grounds excludes faith from science, it will most certainly, and even more entirely, exclude all vague superstitions. In times, however, and under circumstances in which scientific studies are as much disordered and disorganised as the national and primitive

[5] Zeller, Phil. d. Griech., iii. 1, S. 289, E. T. tr. Reichel (= Stoics, &c.), p. 323: "In a word, Stoicism is not only a philosophic, but also a religious system. As such it was regarded by its first adherents, . . . and as such, together with Platonism, it afforded in subsequent times, to the best and most cultivated men, a substitute for declining natural religion, a satisfaction for religious cravings, and a support for moral life, wherever the influence of Greek culture extended." Lecky, Hist. Eur. Morals, i. 327, says of the Roman Stoics of the first two centuries: "On occasions of family bereavement, when the mind is most susceptible of impressions, they were habitually called in to console the survivors. Dying men asked their comfort and support in the last hours of their life. They became the directors of the conscience of numbers who resorted to them for a solution of perplexing cases of practical morals, or under the influence of despondency or remorse." For the extinction of the Stoic influence, and its supplanting by the Neo-Platonic mysticism, comp. Lecky, *loc. cit.*, p. 337. Zeller, iii. 2, S. 381, observes: "Neo-Platonism is a religious system, and it is so not merely in the sense in which Platonism and Stoicism may also be so described: it is not merely content to apply to the moral duties and spiritual life of man a philosophy starting from the idea of God, but nevertheless attained by a scientific method. But even its scientific view of the world reflects from first to last the religious disposition of man, and is thoroughly dominated by the wish to meet his religious needs, and to bring him into the most intimate personal communion with the Deity."

forms of faith, this proposition has indeed its application. So was it in imperial times.

There was then, in truth, no tendency, no need of life which had not a corresponding religious form; but by the side of the wanton festivals of Bacchus, the secret and alluring mysteries of Isis, there silently spread, wider and wider, the love of a strict and self-denying asceticism.

As in the case of individuals who have become blasé and enervate after exhausting all pleasures, at last the one charm of novelty remains—that of an austere, self-denying life; so was it on a large scale in the ancient world; and thus it was only natural that this new tendency, being as it was in sharpest contrast with the cheerful sensuousness of the older world, led men to an extreme of world-avoidance and self-renunciation.[6]

Christianity, with its wonderfully fascinating doctrine of the kingdom that is not of this world, seemed to offer the most admirable support to these views.

The religion of the oppressed and the slave, of the weary and heavy-laden, attracted also the luxurious rich who could no longer be satisfied with luxury and wealth. And so with the principle of renunciation was allied that of universal brotherhood, which contained new spiritual delights for the heart seared by selfishness. The longing of the wandering and isolated spirit after a close tie of community and a positive belief was satisfied; and the firm coherence of the believers, the imposing union of communities ramifying everywhere through the wide world, effected more for the propagation of the new religion than the mass of miracles that was related to willingly believing ears. Miracle was, in short, not so much a missionary instrument as a necessary complement of faith in a time that set no measure to its love or its belief in miracles. In this respect not only did priests of Isis and magicians compete with Christianity, but even philosophers appeared in the character of miracle-workers and God-

[6] An account of this extreme, as it made itself specially felt after the third century, is to be found in Lecky, Hist. Eur. Morals, ii. 107 foll.

accredited prophets. The feats of a Cagliostro and a Gassner in modern times are but a faint copy of the performances of Apollonius of Tyana, the most famous of the prophets, whose miracles and oracles were partly believed even by Lucian and Origen. But the result of all this was to show that only simple and consistent principles can work a lasting miracle—that miracle, at least, which gradually united the scattered nations and creeds around the altar of the Christians.[7]

Christianity, by preaching the gospel to the poor, unhinged the ancient world.[8] What will appear in the fulness of time as an actual fact, the spirit of faith already apprehended in imagination—the kingdom of love, in which the last are to be first. The stern legal idea of the Romans, which built order upon force, and made property

[7] As to the spread of Christianity, compare the celebrated fifteenth chapter of Gibbon, which is full of material for the estimation of this fact from the most varied standpoints. More correct views, however, are put forward by Lecky in his "History of European Morals," and in the "History of Rationalism in Europe." As the chief work on the theological side, may be named Baur, das Christenthum, u. die christliche Kirche der drei ersten Jahrhunderte. From the philosophico-historical standpoint, E. von Lasaulx, der Untergang des Hellenismus u. die Einziehung seiner Tempelgüter durch die christl. Kaiser, München, 1854. For further literature, see in Ueberweg in the "History of the Patristic Philosophy," a section of his history which unfortunately has not met with the approbation it deserves (comp. my Biographie Ueberwegs, Berlin, 1871, S. 21, 22).

On the miracle-mania which marked this period, compare particularly Lecky, Hist. of Eur. Morals, i. 393. Also p. 395 as to miracle-working philosophers: "Christianity floated into the Roman Empire on the wave of credulity that brought with it this long train of Oriental superstitions and legends. . . . Its miracles were accepted by both friend and foe as the ordinary accompaniments of religious teaching."

[8] How much the influence of the Christian care for the poor was felt is shown by the remarkable fact that Julian 'the Apostate,' in his attempt to supplant Christianity by a philosophic Greek State-religion, openly recognised the superiority of Christianity in this respect to the old religion. He recommended, accordingly, in order to rival the Christians in this respect, the establishment in every town of Xenodocheia, in which strangers should be received without respect to creed. For the maintenance of them, and also for distribution to the poor, he devoted considerable sums of money. "For it is disgraceful," he wrote to Arsacius, the high-priest of the Galatians, "that no one of the Jews begs, while the atheistic Galileans not only maintain their own poor, but also any whom we leave helpless."—Lasaulx, Untergang des Hellenismus, S. 68.

the immovable foundation of human relations, was met by a demand, made with incredible weight, that one should renounce all private claims, should love one's enemies, sacrifice one's treasures, and esteem the malefactor on the scaffold equally with one's self.

A mysterious awe of these doctrines seized the ancient world,[9] and those in power sought in vain by cruel persecutions to repress a revolution which overturned all existing things, and laughed not only at the prison and the stake, but even at religion and law. In the bold self-sufficiency of the salvation which a Jewish traitor, who had suffered the death of a slave, had brought down from heaven as a gracious gift from the eternal Father, this sect conquered country after country, and was able, while clinging to its main principles, little by little to press into the service of the new creation the superstitious ideas, the sensuous inclinations, the passions, and the legal conceptions of the heathen world, since they could not be wholly destroyed. The place of old Olympus, with its wealth of myth, was occupied by the saints and martyrs. Gnosticism constituted the elements

[9] Compare Tacitus, Annals, xv. 44, where it is said that Nero laid the blame of the burning of Rome upon the Christians. He "inflicted the most exquisite tortures on a class hated for their abominations, called Christians by the populace. Christus, from whom the name had its origin, suffered the extreme penalty during the reign of Tiberius, at the hands of one of our procurators, Pontius Pilatus, and a most mischievous superstition, thus checked for the moment, again broke out, not only in Judaea, the first source of the evil, but even in Rome, where all things hideous and shameful from every part of the world find their centre and become popular. Accordingly, an arrest was first made of all who pleaded guilty; then, upon their information, an immense multitude was convicted, not so much of the crime of firing the city, as of hatred against mankind." Their associating amongst themselves, together with their hatred of others, was frequently made a subject of reproach to the Jews also. Lasaulx, Untergang des Hellenismus, S. 7 foll., shows the internal necessity of this view of the Romans, and quotes similar judgments from Suetonius and the younger Pliny. In the same place, very accurate references to the intolerance (strange to Greeks and Romans alike) of the Monotheistic religions, amongst which Christianity particularly from the first took up an *offensive* attitude. Gibbon reckons as one of the chief causes of the rapid propagation of Christianity its intolerant zeal, and the expectation of another world. For the threatening of the whole human race with the everlasting torments of hell, and the influence of this threat upon the Romans, comp. Lecky, Hist. Eur. Morals, i. 447 foll.

of a Christian philosophy. Christian schools of rhetoric were opened for all those who sought to combine the ancient culture with the new belief. From the simple and austere discipline of the early Church were developed the elements of a hierarchy. The bishops gathered unto themselves riches, and led an arrogant and worldly life; the rabble of the great cities became intoxicated with hatred and fanaticism. The care of the poor disappeared, and the usurious rich protected their nefarious gains by a system of police. The festivals speedily resembled in their wantonness and ostentation those of the decaying heathenism, and the piety of devotion in the surge of disordered emotions appeared bent upon destroying the life-germs of the new religion. But it was not so destroyed. Struggling against the foreign forces, it made its way. Even the ancient philosophy, which, from the turbid sources of Neo-Platonism, poured into the Christian world, had to adapt itself to the character of this religion; and whilst cunning, treachery, and cruelty helped to found the Christian state—in itself a contradiction—the thought of the equal calling of all men to a higher existence remained the basis of modern popular development. So, says Schlosser, was the caprice and deceit of mankind one of the means by which the Deity developed a new life from the mouldering ruins of the ancient world.[10]

It now becomes our duty to examine the influence that the carrying out of the Christian principle must have exercised upon the history of Materialism, and with this we will connect the consideration of Judaism and of Mohammedanism, which latter is of special importance.

What these three religions have in common is Monotheism.

When the heathen regards everything as full of gods, and has become accustomed to treat every individual event as the special sphere of some daemonic influence, the

[10] Schlosser, Weltgesch. f. d. deutsche Volk, bearb. v. Kriegk, iv. 426 Gesch. der Römer, xiv. 7).

difficulties which are thus opposed to a Materialistic explanation of the universe are as thousandfold as the ranks of the divine community. If some inquirer conceives the mighty thought of explaining everything that happens out of necessity, of the reign of laws, and of an eternal matter whose conduct is governed by rules, there is no more any reconciliation possible with religion. Epikuros's forced attempt at mediation is but a weakly effort, therefore, and more consistent were those philosophers who denied the existence of the gods. But the Monotheist occupies a different position in relation to science. We admit that even Monotheism admits of a low and sensuous interpretation, in which every particular event is again attributed to the special and local activity of God in anthropomorphic fashion. And this is the more possible because every man naturally thinks only of himself and his own surroundings. The idea of omnipresence remains a mere empty formula, and one has really again a multiplicity of gods, with the tacit proviso that we shall conceive them all as one and the same.

From this standpoint, which is peculiarly that of the charcoal-burner's creed, science remains as impossible as it was in the case of the heathen creed.

Only when we have a liberal theory of the harmonious guidance of the whole universe of things by one God, does the cause and effect connection between things become not only conceivable, but is, in fact, a necessary consequence of the theory. For if I were to see anywhere thousands upon thousands of wheels in motion, and supposed that there was one who appeared to direct them all, I should be compelled to suppose that I had before me a mechanism in which the movements of all the smallest parts are unalterably determined by the plan of the whole. But if I suppose this, then I must be able to discover the structure of the machine, at least partially to understand its working, and so a way is opened on which science may freely enter.

For this very reason developments might go on for cen-

turies, and enrich science with positive material, before it would be necessary to suppose that this machine was a *perpetuum mobile*. But when once entertained, this conclusion must appear with a weight of facts by the side of which the apparatus of the old Sophists appears to us utterly weak and inadequate.

And here, therefore, we may compare the working of Monotheism to a mighty lake, which gathers the floods of science together, until they suddenly begin to break through the dam.[11]

But then there came into view a fresh trait of Monotheism. The main idea of Monotheism possesses a dogmatic ductility and a speculative ambiguity which specially adapt it, amid the changing circumstances of civilisation, and in the greatest advances of scientific culture, to serve as the support of religious life. The theory of a recurrent or independent regulation of the universe, in pursuance of eternal laws, did not, as might have been expected, lead at once to a mortal struggle between religion and science; but, on the contrary, there arose an attempt to compare the relation between God and the world to that of body and soul. The three great Monotheistic religions have therefore all, in the period of the highest intellectual development of their disciples, tended to Pantheism. And even this involves hostility to tradition; but the strife is very far from being mortal.

It is the Mosaic creed which was the first of all religions to conceive the idea of creation as a creation out of nothing.

Let us call to mind how the young Epikuros, according to the story, while yet at school, began to devote himself to philosophy, when he was obliged to learn that all things arose from chaos, and when none of his teachers could tell him what then was the origin of chaos.

There are peoples which believe that the earth rests

[11] This in modern times refers especially to the turning-point made by the popularising of Newton's system of the universe by Voltaire.

upon a tortoise, but you must not ask on what the tortoise rests. So easily is mankind for many generations contented with a solution which no one could find really satisfactory.

By the side of such fantasies the creation of the world from nothing is at least a clear and honest theory. It contains so open and direct a contradiction of all thought, that all weaker and more reserved contradictions must feel ashamed beside it.[12]

But what is more: even this idea is capable of transformation; it too has a share of the elasticity which characterises Monotheism; the attempt was ventured to make the priority of a worldless God one purely of conception, and the days of creation became aeons of development.

In addition to these features, which had already belonged to Judaism, it is important that Christianity first requires that God shall be conceived as free from any physical shape, and strictly as an invisible spirit. Anthropomorphism is thus set aside, but returns first in the turbid popular conception, and then a hundredfold in the broad historical development of the dogma.

We might suppose, since these are the prominent traits of Christianity, that, when it gained its victory, a new science might have blossomed more luxuriantly; but it is easy to see why that was not the case. On the one hand we must bear in mind that Christianity was a popular religion, which had developed and spread from beneath upwards until the point at which it became the religion of the State. But the philosophers were just the people who stood furthest removed from it, and the more so as they were the less inclined to pietism or the mystical treatment of philosophy.[13] Christianity extended itself to new peoples

[12] It is interesting to observe how, in Mohammedan orthodoxy, recourse is had to atoms to render more intelligible the transcendental creation by a God who is outside the universe. Compare Renan, Averroès et l'Averroisme, Paris, 1852, p. 80.

[13] It is true, indeed, that the mystic Neo-Platonists such as Plotinus and Porphyry were decided opponents of Christianity (Porphyry wrote fifteen books against the Christians), but internally they stood very near to the Christian doctrine, just as it cannot

hitherto inaccessible to civilisation, and it is no wonder that in a school beginning again from the foundations, all those preliminary steps had again to be made which ancient Greece and Italy had been through since the period of the earliest colonisations. Above all, however, we must bear in mind that the emphasis of the Christian doctrine by no means rested originally on its great theological principles, but much rather on the sphere of moral purification through the renunciation of worldly desires, on the theory of redemption, and on the hope of the advent of Christ.

Moreover, it was a psychological necessity that as soon as this immense success had restored religion generally to its ancient privileges, heathen elements in mass forced their way into Christianity, so that it speedily acquired a rich mythology of its own. And so, not merely Materialism, but all consistent monistic philosophy, became, for hundreds of years to come, an impossibility.

But a dark shadow fell especially upon Materialism. The dualistic tendency of the religion of the Zend-Avesta, in which the world and matter represent the evil principle, God and light the good, is related to Christianity in its fundamental idea, and especially in its historical development. Nothing, therefore, could appear more repugnant than that tendency of the ancient philosophy, which not only assumed an eternal matter, but went so far as to make this the only really existing substance. If we add the Epikurean moral principle, however purely it may be conceived, the true antithesis of the Christian theory is complete, and we can comprehend the perverse condemnation of this system which prevailed in the Middle Ages.[14]

be doubted that they acquired great influence over the late development of Christian philosophy. Much further really stood Galen and Celsus (although he, too, is not, as was formerly believed, an Epikurean, but a Platonist: See Ueberweg's Hist. of Phil. § 65). Furthest removed are the sceptics of the school of Aenesidemus and the "empirical physicians" (Zeller, iii. 2, 2 Aufl. S. 1 foll.), especially Sextus Empiricus.

[14] From a very early period, therefore, dates the vulgarisation of the notions of 'Epikurean' and 'Epikureanism' in the sense of absolute oppo-

In this last point, the third of the great monotheistic religions, Mohammedanism, is more favourable to Materialism. This, the youngest of them, was also the first to develop, in connection with the brilliant outburst of Arabian civilisation, a free philosophical spirit, which exercised a powerful influence primarily upon the Jews of the middle ages, and so indirectly upon the Christians of the West.

Even before the communication of Greek philosophy to the Arabians, Islam had produced numerous sects and theological schools, some of which entertained so abstract a notion of God that no philosophical speculation could proceed further in this direction, whilst others believed nothing but what could be understood and demonstrated; others, again, combined fanaticism and incredulity into fantastic systems. In the high school at Basra there arose, under the protection of the Abbassides, a school of rationalists which sought to reconcile reason and faith.[15]

By the side of this rich stream of purely Islamitic theology and philosophy, which has not unjustly been compared with the Christian Scholasticism, the Peripatetics of whom we usually think when the Arabian medieval philosophy is mentioned, form but a relatively unimportant branch, with little internal variety; and Averroes, whose name was, next to that of Aristotle, the most frequently mentioned in the West, is by no means a star of the first magnitude in the heavens of the Mohammedan philosophy.

sition to the transcendental theism and ascetic dogmatism. While the Epikurean school (see above, p. 125), among all the ancient philosophical schools, preserved the most distinctive stamp and the most self-contained system of doctrines, the Talmud already describes Sadducees and Freethinkers generally as Epikureans. In the twelfth century there appears in Florence a sect of 'Epikureans,' which can scarcely be considered so in the strict Scholastic sense, any more than the Epikureans whom Dante describes as lying in fiery pits (comp. Renan, Averroès, pp. 123 and 227). A similar vulgarisation has, of course, befallen also the name of the 'Stoics.'

[15] Renan, Averroès, p. 76 ff., shows how the most abstract shape of the idea of God was essentially promoted by the opposition waged against the Christian doctrines of the Trinity and the incarnation of the Deity. The mediatising school of the 'Motazelites' is compared by Renan with the school of Schleiermacher.

His true importance lies much rather in the fact that it was he who gathered together the results of the Arabico-Aristotelian philosophy as the last of its great representatives, and delivered them to the West in a wide range of literary activity, and especially by his commentaries on Aristotle. This philosophy was developed, like the Christian Scholasticism, from a Neo-Platonically coloured interpretation of Aristotle; only that while the Scholastics of the first period possessed a very slender stock of Peripatetic traditions, and those thoroughly intermingled and controlled by the Christian theology, the springs flowed to the Arabians through the channel of the Syrian schools in much greater abundance, and thought was with them developed with greater freedom from the influence of theology, which pursued its own paths of speculation. So it resulted that the naturalistic side of the Aristotelian system (*cf.* above, p. 85) could develop itself amongst the Arabians in a manner which remained quite foreign to the earlier Scholasticism, and which later made the Christian Church regard Averroism as a source of the most arrant heresies. There are three points in particular here to be regarded: the eternity of the world and of matter in its opposition to the Christian doctrine of creation; the relation of God to the world, according to which he influences either only the outermost sphere of the fixed stars, and all earthly things are only indirectly governed by God through the power of the stars, or God and the world run into each other in pantheistic fashion;[16] finally, the doctrine of the unity of the reason, which is the only immortal part of

[16] To the first of these views Avicenna gave his adhesion, while the second, according to an opinion started by Averroes, is supposed to have been his real view. Averroes himself makes all change and movement in the world, and especially the becoming and perishing of organisms, potentially inherent in matter, and God has nothing to do but to turn this potentiality into actuality. But as soon as we place ourselves at the standpoint of eternity, the distinction between potentiality and actuality disappears, since in the course of eternity all potentialities become actualities. But thus disappears also from the highest standpoint of observation the opposition, too, of God and the world. *Cf.* Renan, Averroès, pp. 73 and 82 foll.

man—a doctrine which denies individual immortality, since the reason is only the one divine light which shines in upon the soul of man, and makes knowledge possible.[17]

It is intelligible enough that such doctrines must have exercised a mischievous interference in the world under the sway of Christian dogma, and that in this way, as well as through its naturalistic elements, Averroism prepared the way for the new Materialism. For all that, the two tendencies are fundamentally different, and Averroism became a chief pillar of that Scholasticism which, by the unconditional reverence for Aristotle, and by the strengthening of those principles which we shall examine more closely in the following chapter, rendered so long impossible a Materialistic consideration of things.

But besides its philosophy, we have to thank the Arabian civilisation of the middle ages for still another element, which stands perhaps in yet closer relation to the history of Materialism; that is, its achievements in the sphere of positive inquiry, of mathematics and the natural sciences, in the broadest sense of the term. The brilliant services of the Arabians in the field of astronomy and of mathematics are sufficiently known.[18] And it was these studies particularly which, connecting themselves with Greek traditions, again made room for the idea of the regularity and subjection to law of the course of nature. This happened at a time when the degeneracy of belief in the Christian world had brought more disorder into the moral and logical order of things than had been the case at any period of Græco-Roman heathenism; at a

[17] This view, which rests upon the Aristotelian theory of the *νοῦς ποιητικός* (De Anima, iii. 5), has been designated "Monopsychism," that is, the doctrine that the immortal soul (in distinction from the perishable animal soul) in all beings that partake of a soul is one and the same.

[18] Comp. Humboldt's Kosmos, ii. 258 foll. E. T.; Bohn's ed., ii. 592, *cf.* 582. Draper, Intellectual Development of Europe (ed. 1875), ii. 36 foll. The author, who is best qualified to speak in the matter of natural science (*cf.* above, note 4), complains (p. 42) of "the systematic manner in which the literature of Europe has contrived to put out of sight our scientific obligations to the Mohammedans."

time when everything was regarded as possible and nothing as necessary, and an unlimited field was allowed for the discretion of beings, which were ever endowed by the imagination with fresh properties.

The mingling of astronomy with the fantasies of astrology was, for this very reason, not so disadvantageous as might be supposed. Astrology, as well as the essentially related alchemy, possessed in every respect the regular form of sciences,[19] and were, in the purer shape in which they were practised by the Arabian and the Christian savants of the middle ages, far removed from the measureless charlatanry which made its appearance in the sixteenth and especially in the seventeenth century, and after austerer science had rejected these fanciful elements. Apart from the fact that the impulse to inquiry into important and unfathomable secrets through that early connection came to the aid of the scientific discoveries in astronomy and chemistry, in those deep mysterious studies

[19] Comp. Liebig, Chemische Briefe, 3 and 4 Br. The remark, "Alchemy was never anything more than chemistry," goes, of course, a little too far. As to the caution against confounding it with the gold-making art of the sixteenth and seventeenth centuries, it must not escape us that this is only alchemy run wild, just as the nativity delusion of the same period is astrology run wild. The most important contrast between the spirit of modern chemistry and of medieval alchemy may be most clearly shown in the relation between theory and experiment. With the alchemists the theory in all its main features stood unshakably firm; it was ranked above experiment; and if this gave an unexpected result, this was forced into an artificial conformity with the theory, which was of aprioristic origin. It was therefore essentially directed to the production of this previously anticipated result rather than to free investigation. This tendency of experiment is indeed still active enough in our modern chemistry, and the authority of general theories, if not in our own days, at all events in a period not very far behind us, was very great. Yet the real principle of modern chemistry is the empirical; that of alchemy, despite its empirical results, was the Aristotelo-scholastic. The scientific form of alchemy as well as of astrology rests upon the consistent carrying out of certain axioms as to the nature of all bodies and their mutual relations—axioms simple in themselves, but capable of the utmost varieties in their combinations. As to the furtherance of the scientific spirit by means of astrology in its purer forms, compare, further, Lecky, Hist. of Rationalism in Europe, i. 302 foll.; where also, in note 2 to p. 303, several instances are given of the bold ideas of astrological freethinkers. Compare also Humboldt's Kosmos, ii. 256 foll.

themselves was implied, as a necessary presupposition, the belief in a regular progress of events following eternal laws. And this belief has formed one of the most powerful springs in the whole development of culture from the middle ages to modern times.

We must here also have special regard to medicine, which in our days has become in a certain measure the theology of Materialists. This science was treated by the Arabs with especial zeal.[20] Here too, whilst attaching themselves chiefly to Greek traditions, they nevertheless set to work with an independent feeling for exact observation, and developed especially the doctrine of life, which stands in so close a connection with the problems of Materialism. In the case of man, as well as in those of the animal and vegetable worlds, everywhere, in short, in organic nature, the fine sense of the Arabians traced not only the particularities of the given object, but its development, its generation, and decay—just those departments, therefore, in which the mystic theory of life finds its foundation.

Every one has heard of the early rise of schools of medicine on the soil of Lower Italy, where Saracens and the more cultivated Christian races came into such close contact. As early as the tenth century, the monk Constantine taught in the monastery of Monte Cassino, the man whom his contemporaries named the second Hippokrates, and who, after wandering through all the East, dedicated his leisure to the translation from the Arabic of medical works. At Monte Cassino, and later at Salerno and Naples, arose those famous schools of medicine, to which the seekers for knowledge streamed from the whole Western world.[21]

[20] Draper, Intell. Develp. of Europe, i. 384 foll. Less favourable judgments of Arabian medicine will be found in Häser, Gesch. d. Med. (2 Aufl., Jena, 1853), 173 foll., and in Daremberg, Hist. des Sciences Médicales (Paris, 1870). Yet their great activity in this department is shown clearly enough even in these accounts.

[21] Comp. Wachler, Handb. der Gesch. d. Liter., ii. S. 87. Meiners,

Let us observe, that it was upon the same territory that the spirit of freedom first took its rise in Europe—a spirit which we must not indeed confound with complete Materialism, but which is at all events closely related to it. For that strip of land in Lower Italy, and especially that in Sicily, where to-day blind superstition and mad fanaticism are at their height, was then the native home of enlightened minds and the cradle of the idea of toleration.

Whether the Emperor Frederick II., the highly cultivated friend of the Saracens, the scientific protector of the positive sciences, really uttered the famous expression about the three impostors, Moses, Mohammed, and Christ,[22] this time and place at least produced such opinions. Not without reason did Dante count by thousands the bold doubters who, resting in their fiery graves, ever preserve their contempt for hell. In that close contact of the different monotheistic religions—for at that time the Jews were there very numerous, and were in point of culture scarcely behind the Arabians—it was inevitable that, as soon as intellectual intercourse took place, the reverence for specific forms should be blunted; and yet it is in the specific that the force of religion lies, as the force of poetry lies in the individual.

Hist. Vergleich der Sitten u. s. w. des Mittelalters mit d. unsr. Jahrh., ii. 413 foll. Daremberg, Hist. des Sciences Méd., i. 259 foll., shows that the importance of Salerno in medicine is older than the influence of the Arabians, and that here probably ancient traditions had survived. Yet the school certainly received a great impulse through the Emperor Frederick II.

[22] The assertion that Averroes, or the Emperor Frederick II., or some other insolent freethinker, spoke of Mohammed, Christ, and Moses as the 'three impostors,' appears in the middle ages to have been merely unfounded calumny, and a means of drawing hatred and suspicion upon persons of freethinking tendency. Later a book on the Three Impostors became the subject of this fabulous story, and a long series of liberal men (see the list of them in Genthe, De Impostura Religionum, Leipz. 1833, p. 10 sq., as well as in Renan, Averroes, p. 235) were accused of having written a book which did not even exist, until at length the zeal with which the question of its existence was debated led certain industrious forgers to the fabrication of such writings, which, however, turned out very feeble productions. For further details see Genthe, *loc. cit.*

How much Frederick II. was distrusted is shown by the accusation that he was in complicity with the Assassins, those murdering Jesuits of Mohammedanism, who are said to have had a secret doctrine which openly and freely expressed to the utmost a complete atheism, with all the logical consequences of an egoism seeking to gratify its lust of pleasure and power. If the tradition of the doctrines of the Assassins were true, we should have to pay this sect more respect than that of this incidental mention. The Assassins of the highest type would then represent the model of a Materialist such as the ignorant and fanatical partisans of our day love to imagine him in order to be able to urge a successful contest with him. The Assassins would be the solitary historical example of a combination of Materialistic philosophy with cruelty, lust of power, and systematic crime.

Let us not forget, however, that all our information as to this sect proceeds from their bitterest foes. It amounts to the highest degree of internal improbability that from the most harmless of all theories of the universe should have proceeded an energy so fearful that it demands the utmost strain of all the forces of the soul—an energy which in all other cases we find only in union with religious ideas. They are also, in their awful sublimity and transporting charm, the one element in the world's history to which we can pardon even the extremest abominations of fanaticism from the highest standpoint; and this is rooted deep in human nature. We would not venture, in the face of tradition, to build a conjecture upon purely internal grounds, that religious ideas were in the utmost activity amongst the Assassins, unless the sources of our knowledge of the Assassins afforded room for such consideration.[23] That a high degree of freethinking may be

[23] Hammer, in his book, based upon Oriental sources, "The History of the Assassins," Stutt. and Tub. 1818, E. T. 1835, is entirely of the view which divides the Assassins into deluders and deluded, and in the highest grades finds nothing but cold-blooded calculation, absolute unbelief, and the most vicious egotism. Enough, indeed, to this effect can be found in

combined with the fanatical conception of a religious idea, is proved by the case of the Jesuits, with whose whole being that of the Assassins has a striking similarity.

To return to the natural science of the Arabians, we cannot, in conclusion, avoid quoting the bold expression of Humboldt, that the Arabians are to be considered the proper founders of the physical sciences, "in the signification of the term which we are now accustomed to give it." Experiment and measurement are the great instruments with the aid of which they made a path for progress, and raised themselves to a position which is to be placed between the achievements of the brief inductive period of Greece, and those of the more modern natural sciences.

That Mohammedanism exhibits most of that furtherance of natural study which we assign to the Monotheistic principle, falls in with the talents of the Arabians with their historical and local relation to Greek traditions, without doubt, however, also with the circumstance that the Monotheism of Mohammed was the most absolute, and comparatively the freest from mythical adulterations. Finally, let us place among the new elements of culture which might react upon a Materialistic theory of nature

the sources; and yet we must not forget that this is the usual way in which victorious orthodoxy deals with defeated sects. It is really here, apart from the frequent instances of malicious misrepresentation, just as it is with our judgment of so-called 'hypocrites' in private life. Unusual piety is in the popular eyes either genuine saintship or a wicked cloak of all that is vile. For the psychological subtlety of the mixture of genuine religious emotions with coarse selfishness and vicious habits the ordinary mind has no appreciation. Hammer sets forth his own view of the psychological explanation of the Assassin movement in the following words (S. 20, E. T. p. 13):—"Of all the passions which have ever called into action the tongue, the pen, or the sword, which have overturned the throne, and shaken the altar to its base, ambition is the first and mightiest. It uses crime as a means, virtue as a mask. It respects nothing sacred, and yet it has recourse to that which is most beloved, because the most secure, that of all held most sacred by man—religion. Hence the history of religion is never more tempestuous and sanguinary than when the tiara, united to the diadem, imparts and receives an increased power." But when was there ever a priesthood which was *not* ambitious; and how can religion be the most sacred element of humanity if its first servants find in it only a means to satisfy their ambition? And why is ambition so common and so dangerous a passion,

this further one, which is handled at length by Humboldt in the second volume of his Kosmos—the development of the aesthetical contemplation of nature under the influence of Monotheism and of Semitic culture.

The ancients had carried personification to the utmost pitch, and seldom got so far as to regard or to represent nature simply as nature. A man crowned with reeds represented the ocean, a nymph the fountain, a faun or Pan the plain and the grove. When the landscape was robbed of its gods, then began the true observation of nature, and joy at the mere greatness and beauty of natural phenomena.

"It is a characteristic," says Humboldt,* "of the poetry of the Hebrews, that, as a reflex of Monotheism, it always embraces the universe in its unity, comprising both terrestrial life and the luminous realms of space. It dwells but rarely on the individual phenomenon, preferring the contemplation of great masses. . . . It might be said that one single psalm (Ps. civ.) represents the image of the whole kosmos: The Lord, 'who coverest thyself with light as with a garment; who stretchest out the heavens like a

since for the most part it only leads, by a very thorny and extremely uncertain way, to that life of pleasure which is regarded as the object of every selfish man? There is obviously acting, often at least, and almost always in the great events of world-history, in connection with ambition, an ideal which is partly in itself overprized, but partly passes into a one-sided relation to the particular person regarded as its special bearer. And this is the reason why it is *religious* ambition especially that is so frequent, for the cases in which religion is employed by an ambitious but not religious person as a valuable means must be very rare in history.

These considerations apply also to the Jesuits, who at certain periods of their history have certainly come very near to the Assassins, as Hammer represents them; while, at the same time, they would scarcely have been able to establish their power in the souls of believers without the help of genuine fanaticism. Hammer often adduces them, and certainly with justice, as a parallel to the case of the Assassins (S. 337, *et passim*, E.T. 216); but when he thinks the regicides of the French Revolution worthy to have been satellites of the 'old man of the mountain,' this shows how easily such generalisations may lead to a misapprehension of peculiar historical phenomena. It is certain that the political fanaticism of the French 'men of terror' was, on the whole, very sincere, and by no means hypocritical.

* Kosmos, E. T., Bohn's ed., ii. 412, 413.

curtain; who laid the foundations of the earth, that it should not be removed for ever. He sendeth the springs into the valleys, which run among the hills: thou hast set a bound that they may not pass over; that they turn not again to cover the earth. They give drink to every beast of the field. By them shall the fowls of the air have their habitation, which sing among the branches. The trees of the Lord are full of sap; the cedars of Lebanon which he hath planted, where the birds make their nests; as for the stork, the fir-trees are her house.'"

To the times of the Christian anchorites belongs a letter of Basil the Great, which in Humboldt's translation affords a magnificent and feeling description of the lonely forest in which stood the hermit's hut.

So the sources flowed on all sides to form the mighty stream of modern intellectual life, in which, under numerous modifications, we have again to seek for the object of our inquiry, Materialism.

CHAPTER II.

SCHOLASTICISM AND THE PREDOMINANCE OF THE ARISTOTELIAN NOTIONS OF MATTER AND FORM.

WHILE the Arabians, as we saw in the previous chapter, drew their knowledge of Aristotle from abundant though much polluted sources, the Scholastic philosophy of the West began by dealing with extremely scanty, and, at the same time, much corrupted traditions.[24] The chief portion of these materials consisted of Aristotle's work on the 'Categories,' and an introduction to it by Porphyry in which the "five words" are discussed. These five words, which form the entrance to the whole Scholastic philosophy, are genus, species, difference, property, and accident. The ten categories are substance, quantity, quality, relation, place, time, position, possession, action, and passion.

It is well known that there is a large and still steadily increasing body of literature on the question what Aristotle exactly meant by his categories, that is, predications, or species of predication. And this object would have been sooner attained if men had only begun by making up their minds to treat as such all that is crude and un-

[24] Prantl, Gesch. der Logik im Abendlande, ii. 4, finds in Scholasticism only theology and logic, but no trace at all of 'philosophy.' It is quite correct, however, to say that the different periods of Scholasticism can only be distinguished according to the varying influence of the gradually increasing Scholastic material (and so, for example, even Ueberweg's division into the three periods of the incomplete, the complete, and the again inadequate accommodation of Aristotelianism to ecclesiastical doctrines, is untenable). In the same place will be found a complete enumeration of the Scholastic material which the middle ages had at their disposition.

certain in the Aristotelian notions, instead of seeking behind every unintelligible expression for some mystery of the profoundest wisdom. It may now, however, be regarded as settled that the categories were an attempt on the part of Aristotle to determine in how many main ways we can say of any object what it is, and that he allowed himself to be misled by the authority of language into identifying modes of predication and modes of existence.[25]

Without entering here upon the question how far we can justify (*e.g.*, with Ueberweg's logic, or in the sense of Schleiermacher and Trendelenburg) the exhibition of forms of being and forms of thought as parallel, and the assumption of a more or less exact correspondence between them, we must at once point out, what will be made clearer further on, that the confusion of *subjective* and *objective* elements in our conception of things is one of the most essential features of Aristotelian thought, and that this very confusion, for the most part in its clumsiest shape, became the foundation of Scholasticism.

Aristotle, indeed, did not introduce this confusion into philosophy, but, on the contrary, made the *first* attempt to distinguish what the unscientific consciousness is always inclined to identify. But Aristotle never got beyond extremely imperfect attempts to make this distinction; and yet precisely that element in his logic and metaphysic, which is in consequence especially perverse and immature, was regarded by the rude nations of the West as the corner-stone of their wisdom, because it best suited their undeveloped understanding. We find an interesting example of this in Fredegisus, a pupil of Alcuin's, who

[25] This latter point is very well shown by Dr. Schuppe in his work, "The Aristotelian Categories," Berlin, 1871. Less forcible seems to me the argument against Bonitz, with regard to the meaning of the expression κατηγορίαι τοῦ ὄντος. The phrase employed in the text seeks to avoid this controversy, which it would here lead us too far to discuss. According to Prantl, Gesch. der Logik, i. 192, what actually exists receives its full concrete determination by means of the elements expressed in the categories.

honoured Charles the Great with a theological epistle 'De Nihilo et Tenebris,' in which that 'Nothing' out of which God created the world is explained as an actually *existing entity*, and that for the extremely simple reason that every name refers to some corresponding thing.[26]

A much higher position was taken by Scotus Erigena, who declares 'darkness,' 'silence,' and similar expressions, to be notions of the thinking subject; only, of course, Scotus also thinks that the 'absentia' of a thing and the thing itself are of *the like kind:* so therefore are light and darkness, sound and silence. I have, then, at one time a notion of the thing, at another a notion of the absence of the thing, in a precisely similar manner. The 'absence,' therefore, is also objectively given: it is something real.

This is an error which we find also in Aristotle himself. Negation in a proposition (*ἀπόφασις*) he correctly explained as an act of the thinking subject: 'Privation' (*στέρησις*), for example, the blindness of a creature that naturally sees, he regards, however, as a property of the object. And yet, as a matter of fact, we find, instead of the eyes in such a creature, some degenerate form which has nevertheless only positive qualities: we find, it may be, that the creature moves only with much groping and difficulty, but in the motions themselves everything is in its way fixed and positive. It is only our comparison of this creature with others that, on the ground of our experience, we call normal, that gives us the notion of blindness. Sight is wanting only in our conception. The thing, regarded in itself, is as it is, without any reference to seeing or not seeing.

It is easy to perceive that serious blunders like this are to be found also in the Aristotelian enumeration of the categories; most conspicuously in the category of relation (*πρός τι*), as, *e.g.*, 'double,' 'half,' 'greater,' where no one will seriously maintain that such expressions can

[26] Prantl, Gesch. der Logik, ii. 17 foll., esp. Anm. 75.

be applied to things except in so far as they may be compared by the thinking subject.

Much more important, however, became the vagueness as to the relation of word and thing in dealing with the notion of substance and the species.

We have seen how, on the threshold of all philosophy, appear the 'five words' of Porphyry—a selection from the logical writings of Aristotle, intended to supply to the student, in a convenient form, what he chiefly needs at starting. At the head of these expositions stand those of 'genus' and 'species;' and at the very introduction of this introduction stand the eventful words which probably aroused the great medieval controversy about universals. Porphyry mentions the great question whether the genera and species have an independent existence, or whether they are merely in the mind; whether they are corporeal or incorporeal substances; whether they are separate from sensible objects, or exist only in and through them? The decision of the problem so solemnly propounded is postponed, because it is one of the highest problems. Yet we see enough to perceive that the position of the 'five words' at the entrance to philosophy is quite in accordance with the speculative importance of the notions of genus and species, and the expression betrays clearly enough the Platonic sympathies of the writer, although he suspends his judgment.

The Platonic view of the notions of genus and species (comp. p. 74 ff.) was, therefore, in spite of all inclination towards Aristotle, the prevailing view of earlier medieval times. The Peripatetic school had received a Platonic portico, and the young disciple on his entrance into the halls of philosophy was at once greeted with a Platonic consecration; perhaps, at the same time, with an intentional counterbalance to a dangerous feature of the Aristotelian categories. For in the discussion of substance (*οὐσία*), he declares that, in the primary and strict sense, the concrete particulars, such as this particular man, this

horse standing here, are substances. This is, of course, scarcely in accordance with the Platonic contempt for the concrete, and we must not be surprised at the rejection of this doctrine by Scotus Erigena. Aristotle calls the species substances only of the second order, and it is only by the mediation of the species that the genus also has a certain substantiality. Here then was opened, at the very outset of philosophical studies, a wide source of school controversy, although on the whole the Platonic view (Realism, because the universals are regarded as 'res') remained, until nearly the close of the middle ages, the prevailing, and, at the same time, the orthodox doctrine. It is, therefore, the most absolute antithesis to Materialism produced by all antiquity that controls from the first the philosophical development of the middle ages; and even at the dawnings of Nominalism there appeared for many centuries scarcely any tendency to start from the concrete phenomena which could in any degree remind us of Materialism. The whole era was swayed by the name, by the thought-thing, and by an utter confusion as to the meaning of sensible phenomena, which passed like dream-pictures through the miracle-loving brain of philosophising priests.

Things changed, however, more and more after the influence of Arabian and Jewish philosophers had become observable, from the middle of the twelfth century, and gradually a fuller knowledge of Aristotle had been spread by means of translations, first from the Arabic, and later also from the Greek originals preserved at Byzantium. But, simultaneously, the principles of the Aristotelian metaphysic became only more and more fully and deeply rooted.

These principles are, however, of importance for us, not only because of the negative part which they play in the history of Materialism, but also as indispensable contributions to the criticism of Materialism; not indeed as though we must still measure and try the Materialism of to-day by

them, but because only by their assistance can we thoroughly overcome the misunderstandings which constantly threaten us in the discussion of this subject. One portion of the question here concerned has been already decided, what is right and what is wrong in Materialism being already shewn, as soon as the notions with which we have here constantly to deal are made clear; and further, it is essential that we should take them at their immediate source, and observe the gradual modifications they undergo.

Aristotle is the creator of metaphysic, which, as everybody knows, is indebted for its unmeaning name merely to the position of these books in the series of Aristotle's writings. The object of this science is the investigation of the principles common to all existence, and Aristotle therefore calls it the 'first philosophy'—that is, the general philosophy, which has not yet devoted itself to a special branch. The idea of the necessity of such a philosophy was correct enough, but the solution of the problem could not even be approached until it was recognised that the universal is above all that which lies in the nature of our mind, and through which it is that we receive all knowledge. The failure to separate the subject and the object, the phenomenon and the thing-in-itself, is here therefore especially noticeable, as, owing to this failure, the Aristotelian philosophy becomes an inexhaustible source of self-delusion. And the middle ages were especially inclined eagerly to embrace the very worst delusions of this kind; and these are at the same time of special importance for our subject: they lie in the notions of matter and potentiality, as related to form and actuality.

Aristotle mentions four universal principles of all existence: form (or essence), matter (ὕλη, *materia*, as it was rendered by the Latin translators), the efficient cause, and the end.[27] We are here chiefly concerned with the first two.

[27] Ueberweg, Hist. of Phil., 4 Aufl., i. 172–175, E. T. i. 157–159. The references there given are quite enough for our purpose, as we are not here

The notion of matter is, in the first place, entirely different from what we nowadays understand by 'matter.' While our thought retains in so many departments the stamp of Aristotelian conceptions, on this point, through the influence of natural science, a Materialistic element has forced itself into our modes of thinking. With or without Atomism, we conceive of matter as a corporeal thing distributed universally, save where there is a vacuum, and of an essentially uniform nature, although subject to certain modifications.

In Aristotle the notion of matter is *relative;* it is matter in relation to that which is to result from it through the accession of form. Without form the thing cannot be what it is; through form the thing becomes what it is—reality; whilst previously matter had only supplied the potentiality of the thing. Matter has, nevertheless, to begin with a form of its own, though of but a low order, and one quite indifferent in relation to the thing which is to result.

The bronze of a statue, for example, is the matter; the idea of the work is the form; and from the union of the two results the actual statue. Yet the bronze was not the matter in the sense of this particular piece of metal (for as such it had a form which had nothing to do with the statue), but as bronze in general, *i.e.*, as something having no reality in itself, but which 'can' only become something. And so matter also is only potentially existing (*δυνάμει ὄν*), form only in reality or in actuality (*ἐνεργείᾳ ὄν* or *ἐντελεχείᾳ ὄν*). The passing of the possible into actuality is Becoming, and this is, therefore, the moulding of matter by form.

As we see, there is here no question whatever of an independent corporeal substrate of all things. The concrete, phenomenal thing itself, as it here or there exists—*e.g.*, a

concerned with a new view of the Aristotelian metaphysic, but merely with a critical exposition of recognised Aristotelian notions and doctrines.

log of wood lying yonder—is at one time 'substance,' that is, an actualised thing consisting of form and matter, at another time is merely matter. The log is 'substance,' a complete thing, as a log having received from nature the form of a log; but it is 'matter' with regard to the rafter, or the carving which is to be made from it. We have only to add the qualifying words, "in so far as we regard it as matter" (*i.e.*, material). Then everything would be clear, but the conception would no longer be strictly Aristotelian, for Aristotle, in fact, transfers to the things themselves these relations to our thought.

Besides matter and form, Aristotle further regards efficient causes and ends as grounds of all existence, the last of which, in the nature of things, coincides with the form. As the form is the end of the statue, so also Aristotle regards in nature the form that realises itself in matter as the end, or the final cause, in which Becoming finds its natural consummation.

But while this manner of regarding things is consistent enough in its own way, it was completely lost from view that the related notions are throughout of such a kind that they cannot, without producing error, be assumed as actually recognised properties of the objective world, though they may supply a well-articulated system from a subjective standpoint. And it is therefore of the more importance that we should make this clear, because only a very few of the keenest thinkers, such as Leibniz, Kant, and Herbart have entirely avoided this rock, simple as the matter really is.

The underlying error consists in this, that the notion of the possible, of the *δυνάμει ὄν*, which is in its nature a purely subjective assumption, is transferred to things.

It is undeniable that matter and form are but two sides from which we may contemplate the essence of things; and even Aristotle was cautious enough not to say that the essence was compounded from these two, as if they were separable parts; but if we refer the becoming and actually

happening to the interpenetration of matter and form, of potentiality and actuality, the error we have just avoided meets us at this point with redoubled force.

It must much rather be indisputably concluded that if there is no formless matter, even though this can be only assumed and not imagined, then there exists also no potentiality in things. The *δυνάμει ὄν*, the potentially existing, is, as soon as we leave the sphere of fiction, a pure nonentity, no longer to be found. In external nature there is only actuality and no potentiality.

Aristotle regards, for example, the general who has won a battle as an actual conqueror. This actual conqueror, however, was a conqueror before the battle, yet only *δυνάμει, potentia,* potentially. So much we may readily concede, that there lay even before the battle in his person, in the strength and disposition of his army, and so on, conditions which brought about his victory— his victory was possible; but this whole employment of the notion of potentiality rests upon this, that we mortals can never see more than a portion of the causes in action: if we could view all, we should find out that the victory was not 'potential,' but that it was 'necessary;' since the incidental and contributory circumstances stand also in a fixed causal connection, which is so ordered that a particular consequence will result, and no other.

It might be objected that this is quite in harmony with the Aristotelian assumptions; for the general who is necessarily victorious is in a certain way already the conqueror, and still he is not yet actually so, but only 'potentia.'

Here we should have an admirable example of the confusion of notions and of objects. Whether I call the general conqueror or not, he is what he is—a real person, standing at a certain point of time in the course of inner and outer properties and events. The circumstances that have not yet come into play have for him as yet no existence at all; he has only a certain plan in his concep-

tions, a certain strength in his arm and voice, certain moral relations to his army, certain feelings of hope and apprehension; he is, in short, conditioned on every hand. That from these conditions, in connection with other conditions on the side of his opponent, of the ground, of the armies, of the weather, his victory will result, is a relation which, if conceived by our thought, produces the notion of the possibility, or even of the necessity, of a result, without thereby taking anything from him or adding anything to him. No addition is necessary to this notional possibility in order to turn it into actuality, except in our thought.

"A hundred actual thalers," says Kant, "contain no whit more than a hundred potential thalers." [28]

[28] Kant's Kritik d. v. Vemunft, Elementarl., II. Thl. 2 Abth. 2 Buch. Haupst. 4 Abschn., E. T. Meiklejohn, p. 368, ed. Hartenstein, 409.

Kant is there discussing the impossibility of an ontological proof of the existence of God, and shows that 'existence' is not a real predicate at all, that is, not a "conception of something which is added to the conception of some other thing." And so, therefore, the real contains no more (in its conception) than the merely possible, and reality is the existence *of the same thing* as an *object*, of which the (merely logical) possibility gave me only the conception. In order to explain this relation Kant employs the following example: "A hundred real dollars contain no more than a hundred possible dollars. For, as the latter indicate the conception, and the former the object, on the supposition that the content of the former was greater than that of the latter, my conception would not be an expression of the whole object, and would consequently be an inadequate conception of it. In another sense, however, it may be said that there is more in a hundred real dollars than in a hundred possible dollars—that is, in the mere conception of them. For the real object—the dollars—is not analytically contained in my conception, but forms a synthetical addition to my conception (which is merely a determination of my mental state), although this objective reality—this existence—apart from my conception, does not in the least degree increase the aforesaid hundred dollars." The illustration of a treasury-bill, added in the text, attempts to make the matter still clearer, since, in addition to the merely logical possibility (the idea of a hundred dollars) an additional ground of probability is brought into play, which rests upon a partial view of the conditions influencing the actual payment of a hundred dollars. These conditions (partially recognised) are what Ueberweg (*apropos* of Trendelenburg; comp. Ueberweg's Logik, 3 Aufl. S. 167, § 69) calls "real or objective possibility." The appearance of a problematical relation is due to this fact, that we transfer to the object the *relation* which is conceived by our mind between the mere actual presence of the conditions, and the later, also actual existence of the conditioned.

This proposition would appear to a financier doubtful, if not absurd. A few years after Kant's death (July 1808), a treasury-bill for a hundred thalers sold in Königsberg for scarcely twenty-five.[29] So that in the birthplace of the great philosopher, a hundred actual thalers were worth more than four hundred merely potential thalers; and this might be regarded as a brilliant justification of Aristotle and all the Scholastics down to Wolff and Baumgarten. The treasury-bill which is to be obtained for twenty-five actual thalers represents a hundred potential thalers. If we look a little more closely, we see, of course, that what we really get for twenty-five thalers is the very doubtful prospect of the payment at some future time of the hundred thalers; and this is the actual value of the prospect in question, and therefore, of course, the actual value of the bill, which carries the chance with it. But the thing of which we possess the chance is, as before, the full hundred thalers of the nominal value. This nominal value represents the amount of that which is regarded as potentially to be obtained, with a probability, however, of only one-fourth in its favour. The actual value has nothing to do with the amount of the potential sum; and so far Kant was entirely right.

Kant, however, meant by this illustration something more than this, and here again he was right. For when our financier, after the 13th January 1816, had his hundred thalers paid to him in full, nothing was added to the potentiality, so that it became an actuality. The potentiality, as the merely conceived in thought, can never pass into actuality, but actuality arises out of preceding actual circumstances by which it is entirely conditioned. Besides the restoration of the national credit and other circumstances, there is also necessary the presentation of an actual treasury-bill—not of a 'potential' hundred thalers; for these exist only in the brain of the speculator, who represents to himself one portion of the circumstances

which influence the conversion of the paper notes into silver, and makes this the subject of his hopes, and his fears, and his thoughts.

Perhaps we shall be pardoned the length of these remarks, if we again very briefly point out that the notion of potentiality is the source of most of the worst metaphysical fallacies. Aristotle, of course, cannot be blamed for this, since the primary error is grounded deep in our organisation; and this must inevitably be doubly fatal in a system which, more than any previous one, based metaphysics upon dialectical discussion; and the high esteem which Aristotle gained through this very procedure, in other respects so fertile, appeared as though it would perpetuate this misfortune.

After Aristotle, then, had so unhappily explained becoming and motion generally, as results of purely potential matter, and the actualising of form, it was a logical consequence that the form or the end of things must be the true source of motion; and as the soul moves the body, so is God as Form and End of the world the first cause of all motion. It could not be expected that Aristotle should regard matter as moved in itself, since all that he ever allows to it is the negative determination, the potentiality of becoming anything or everything.

The same false conception of potentiality which exercises this corrupting influence on the notion of matter, meets us once more in the relation of the permanent thing to its changing circumstances, or, to keep within the vocabulary of the system, in the relation between substance and accident. The substance is the self-existent essence of the thing, the accident a casual property which is only 'potentially' in the substance. There is really, however, nothing casual in things, although, out of ignorance of the causes, some of them I am obliged to describe as casual.

Just as little can the potentiality of any property or attribute be latent in a thing. This is only a creature of

our combining imagination. Nor, again, can any property be 'potentially' in things, since this is not a form of existence but a form of thought. The seed-corn is not a potential halm, but a seed-corn. If a cloth is wet, this wetness for the moment in which it is, is as much there as a necessary result of general laws, as any other property of the cloth; and if it can be thought of previously as potential, yet the cloth which I shall later dip in water has absolutely no other qualities than another cloth which is to be subjected to no such experiment.

The separation in thought of substance and accident is indeed a convenient, perhaps an indispensable, assistance to us in taking our bearings, but as soon as we begin to go more deeply into the essence of things, we must admit that the distinction between substance and accident likewise disappears. A thing has, it is true, certain qualities which stand in a more durable relation to it than others; but none is absolutely permanent, and at bottom all are in constant change. If we once conceive, then, of substance as a single object, not as a species, nor as a universal corporeal substrate, we must, in order to determine fully its form, limit the consideration of it to a certain period of time, and within this regard all the properties in their mutual interpenetration as the substantial form, and this again as the only essence of the thing.

If we speak, on the other hand, with Aristotle, of the notional (*τὸ τί ἦν εἶναι*) in things as their true substance, we find ourselves already in the field of abstraction; for the logical abstracting process is eventually the same, whether we frame a generic notion from our experience of a dozen cats, or whether we follow our own domestic cat through its life history, through all its changes and vicissitudes, regarding it as one and the same being. Only in the sphere of abstraction has the opposition of substance and accident its importance. For taking our bearings for the practical treatment of things, we shall never be able to dispense entirely with the antithesis worked out by Aris-

totle with masterly acuteness of the potential and the actual, of form and matter, of substance and accident. It is equally certain, however, that in positive inquiry we are always led astray by these notions, as soon as we lose sight of their subjective nature and relative validity, and of their consequent inability to help us to see further into the objective essence of things.

The standpoint of ordinary empirical thought, which in the main remains that of modern Materialism, is by no means free from these defects of the Aristotelian system, since it maintains more firmly and obstinately, if possible, the false antithesis, though in an opposite direction. We ascribe the true being to stuff or matter, which, however, only represents a notion reached by abstraction: we are inclined to regard the matter of things as their substance, and the form as a mere accident. The block out of which a statue is to come every one holds to be real; the form which it is to receive we look upon as merely potential. Nevertheless, it is easy to see that this is only true in so far as the block has a form, which I leave out of consideration, namely, the form in which it came from the quarry. The block as material of the statue, on the other hand, is only so in thought, whilst the idea of the statue, so far as it is conceived by the artist, at least as a conception, possesses a kind of actuality. So far, then, Aristotle was right as against the ordinary empiricism. His mistake lies only in this, that he transfers what is actually the idea of a thinking being to a foreign object, which is the subject of this being's thought, as a potentially present property of the same.

The Aristotelian definitions of substance, form, matter, and so on, prevailed so long as they were understood, so long as Scholasticism reigned alone—that is, in our own country of Germany, until after the time of Cartesius.

If, however, Aristotle had already treated matter somewhat depreciatingly, and in particular had denied to it any motion of its own, this depreciation of matter must have

been increased through the influence of Christianity, which we have sketched in the previous chapter. Men did not reflect that everything by which matter can be anything determinate—for example, evil or sinful—must be form in the Aristotelian sense; the system had not been so far modified that matter was distinguished as the bad or evil principle, but they were still fond of representing it as absolutely passive; and this they conceived to be an imperfection, without reflecting that the perfection of every being consists in its answering to its end, and that, therefore, if we are childish enough to play the censor over the last grounds of all existence, it must much rather redound to the praise of matter, that it keeps so beautifully quiet. When, later, Wolff endowed matter with the *vis inertiæ*, and the physicists empirically transferred the properties of weight and impenetrability to matter, while these must in themselves be forms, the melancholy picture was soon complete.

"Matter is a dark, inert, rigid, and absolutely passive substance."

"And this substance is to think?" asked the one party, while the others complain that there ought to be immaterial substances, because meanwhile the notion of substance in colloquial usage has become identical with that of matter.

Modern Materialism has, of course, not been without influence on these modifications of the notions, although the reaction of the Aristotelian notions and the authority of religion were strong enough to turn the effects of this influence into quite another course. The two men who have exercised the greatest influence in the modelling of the notion of matter are certainly Descartes and Newton. Both occupy in the main the ground of the Atomism which Gassendi had revived (although Descartes, by his denial of vacuum, seeks as far as possible to conceal this); yet in this both are distinguished from Demokritos and Epikuros, that they separate motion from matter, and

make it arise through the will of God, who first creates matter, and then, by an act which may, at least in thought, be regarded as separate, brings motion into it.

For the rest, however, the Aristotelian view lingered longest, and with a comparative exclusiveness in that particular department for which the great laws of Materialism have an especially critical importance—in the sphere of psychology. The foundation of this theory of the soul rests upon the delusion of potentiality and actuality. For Aristotle defines the soul as the actualisation of an organic body possessing a 'potential' life.[30] This expression is in itself neither so puzzling nor so ambiguous as many have found it. 'Actualisation,' or 'consummation,' is rendered by *ἐντελέχεια*, and it is difficult to say how much has been imported into this expression. In Aristotle it indicates the well-known antithesis to *δύναμις*; what further force it may have has crept into it.[31] The

[30] The full definition (De Anima, ii. 1) runs: *ψυχή ἐστιν ἐντελέχεια ἡ πρώτη σώματος φυσικοῦ ζωὴν ἔχοντος δυνάμει τοιούτου δὲ ὃ ἂν ἢ ὀργανικόν.* Comp. v. Kirchmann's translation (Phil. Bibl. Band. 43). The commentary then is, on the whole, excellent; but when v. Kirchmann says (S. 58), that this definition is no definition at all of the soul in the modern sense, but only a definition of the *organic force* which is common to man with animals and plants, this cannot be right, for Aristotle has already premised the explanation that he proposes to give a *universal* idea of the soul, and accordingly one which embraces all kinds of souls. This cannot mean, however, as Kirchmann supposes, the idea of a kind of soul which is common to all animated beings, but, in addition to which, a portion of these beings may have still another kind of soul, and one not included in the definition. The definition must rather embrace the *whole* human soul, including its higher faculties, just as much as, *e.g.*, the plant-soul, and this in fact it does. For according to Aristotle, the human body as an organism is adapted for a *rational* soul; and this soul, therefore, constitutes its actualisation, including within itself the lower faculties.

[31] Fortlage, System der Psychologie, 1855, i. S. 24, says: "Die negative Grösse eines Immateriellen, von welcher die Sphäre des äusseren Sinnes beherrscht sei, wurde von Aristotles durch den räthselhaften und vieldeutigen, darum tiefsinnig scheinenden Ausdruck der *ἐντελέχεια* fixirt, und gleichsam aus nichts zu etwas gemacht." Here the latter statement is undoubtedly true that Aristotle, in the doctrine of the entelechy, has made an apparent entity out of nothing. But this applies not merely to the idea of the soul, but to the whole application of the word *ἐντελέχεια*, and, moreover, to the entire Aristotelian doctrine of potentiality and actuality. In things there is from first to last nothing but complete actuality. Each thing, con-

organic body possesses life only potentially. The actualisation of this potentiality comes from without, and that is all. The internal untruth of the whole theory is even more obvious than in the relation of form and matter, although the antithesis of the two pairs of notions is exactly parallel. That the organic body as the mere potentiality of a human being is in no way conceivable without human form, which, again, on its side, presupposes the active realisation of a human being in plastic material, the soul, that is, is a sunken rock in the orthodox Aristotelian view, which, it cannot be doubted, essentially contributed to the extensive development of Stratonism. Aristotle, in order to avoid this rock, fell back upon the act of generation, as though here at least a formless material, through the psychical energy of the generator, received its actualisation as a human creature; but this is only to transfer the separation of form and matter, actualisation and potentiality which is demanded by the system, into the twilight of an unfamiliar process, and so to fish in troubled waters.[32]

sidered in itself, is entelechy, and when we imagine a thing and its entelechy side by side, this is in effect nothing but a mere tautology. And the case of the soul differs in no respect at all from any other case. *The soul of the man, according to Aristotle, is the man.* This tautology only acquires a deeper significance within the system because (1) the deceptive phenomenon of the body as a merely potential man is opposed to the actual and perfect man (comp. further the following note); (2) the actual and perfect being is then subsequently again confused with the essential or logical portion of the being, with the same equivocalness which is so striking in the notion of the *οὐσία*. And so Aristotle has not fixed "die negative Grösse eines Immateriellen" any more in his notion of the soul than in the notion of form generally. It was the Neo-Platonic view of the supersensuous that first brought mysticism also into the notion of the entelechy, in which it could then indeed admirably luxuriate.

[32] Comp. De An. ii. 1, v. Kirchmann's Translation, S. 61: "Auch ist nicht das, was seine Seele verloren hat, das dem Vermögen nach Lebendige, sondern das, was sie hat; dagegen ist der Same und die Frucht ein solcher Körper dem Vermögen nach." Here Aristotle is endeavouring to avoid the very proper objection that on his system every man must arise out of a dead body by the accession of the entelechy. He may then quite rightly maintain that the corpse is no longer in a proper condition for this, because it is no longer a perfect organisation (although there is still some doubt whether Aristotle's ideas were so advanced; comp. Kirchmann's note on the passage); but, then, it becomes impossible to adduce any case in which the 'potentially' living body would differ from the

The medieval philosophers were able to make good use of this doctrine, however, and brought it into admirable harmony with dogma.

Of much greater value is the profound doctrine of the Stagirite, that man, as the highest product of creation, carries within himself the nature of all the lower stages. The function of plants is to grow and to multiply; the essence of the plant soul is therefore of vegetation. In an animal arise, besides, sensation, motion, appetite; the vegetative life has here entered into the service of the higher or sensitive life. Finally, in man appears the highest principle, that of intellect (*νοῦς*), and dominates the others. By a certain mechanical process, to which Scholasticism was prone, there were made from these elements of human existence three almost completely independent souls—the *anima vegetativa*, the *anima sensitiva*, and the *anima rationalis*, of which man has the first in common with the animal and the plant; the second, at least, in common with the animal; while the last is alone immortal, and of divine origin, and includes all the higher intellectual faculties which are denied to the beasts.[33] From this separation proceeded the favourite distinction of Christian dogmatists between soul and spirit, the two higher forces, while the lowest, or *anima vegetativa*, became the foundation of the later doctrine of vital force.

actually living body, and so Aristotle has recourse to seeds and fruit. In them he finds the appearance of a justification of his antithesis, but only the appearance, for seeds and fruit are themselves living things, and have a form corresponding to the nature of man. But suppose we were to apply the relativity explained in the text and say: The embryo has indeed the form (and therefore the entelechy) of the embryo, but in relation to the *developed man* it is only a *potentiality*, and therefore matter. That sounds well enough so long as we keep our eyes upon the extremes only, and hastily pass over the act of realisation. But if we pursue this method, and follow it through the separate steps, the whole delusion breaks up into nothing; for Aristotle can scarcely have meant to say that the youth is the body of the man, because he is his potentiality.

[33] The separation of the *anima rationalis* from the lower faculties of the soul was indeed denied by the Church, and the converse doctrine was raised to the dignity of a dogma in the Council of Vienne (1311): but the more convenient and more Aristotelian view steadily returned.

There is no room for doubt that Aristotle only mentally separated these forces in man. As the human body has its animal nature, not by the side of the specific human nature, but *in* it, it is a complete animal body of the noblest kind, that, nevertheless, in its particular conformation is specially and thoroughly human; so, according to him, we must conceive the relation of the gradations of the soul. The human form contains the spiritual being in complete interpenetration with the sensitive and appetitive faculties, as these constitute in the animal one and the same thing with the merely vital principle. Only in the doctrine of the 'inseparable' reason—that doctrine upon which rest the Averroistic monopsychism on the one hand, and the Scholastic doctrine of immortality on the other, is the unity abandoned, but even here not without obvious violence to the main features of the system. This unity, which makes the form of man, uniting all lower forms in itself, his soul, was broken up by the Scholastics. For doing this, quite apart from the 'inseparable reason,' they could rely upon many an expression of the great philosopher, who everywhere in his system unites with the keenest consistency in certain main features a striking hesitation in its development. So particularly with the doctrine of immortality, which, like that of the existence of God, adheres very loosely to the system, and in many points contradicts it.[34]

From the Aristotelian philosophy are to be explained many more of the assumptions of the older metaphysic which the Materialists are fond of rejecting as simply absurd. Of this class is especially the assertion that the soul is not only distributed through the whole body, but that it is also wholly present in every part of it. Thomas of Aquin expressly taught that it is not only potentially but actually present in every part of the body, with its

[34] The contradiction in the doctrine of νοῦς in relation to the doctrine of immortality is recognised also by Ueberweg, Grund., 1. 4 Aufl., p. 182, E. T. 168. For the rest, compare note 55 to the first section.

one and indivisible essence. This, to many Materialists, was the height of absurdity, but within the Aristotelian system it is at least as rational as if we say that the principle of the circle, expressed by the one indivisible proposition, $x^2 + y^2 = r^2$, is actualised in any particular portion of a given circle of the radius r whose centre falls at the springing of the co-ordinates.

Let us compare the formal principle of the human body with the equation of the circle, and we shall perhaps understand the root-idea of the Stagirite more purely and clearly than he knew how himself to express it. The question is a quite different one as to the seat of the conscious functions of sensation and appetite. This Aristotle places in the heart; the Scholastics, following Galen, in the brain. Aristotle, however, quite consistently leaves to these functions their physical nature, and hence agrees in one very important point with the Materialists (*cf.* note 31). There, however, the Scholastics would, of course, not follow him, as it cannot be denied that the later metaphysic in many ways introduced a mysterious confusion into their, in themselves, simple and intelligible formulæ, a confusion more akin to utter absurdity than to clear thought.

But if we are here to fully understand the opposition of Materialism to metaphysic, we need only go back to that confusion of existence and thought which had such momentous consequences in the case of the notion of potentiality. We maintain firmly that this confusion had originally the character of vulgar error. It was reserved for modern philosophers to make a virtue of their inability to free themselves from the chains worn for thousands of years, and to erect into a principle this very unestablished identity of being and thought.

If, by the aid of a mathematical construction, I describe a circle with chalk, the form of the local disposition of the chalk particles is first present, of course, in my mind as end. The end becomes the moving cause, the form be-

comes the realisation of the principle in the material parts. But where, then, is the principle? In the chalk? Obviously not in the individual particles; nor, again, in their sum. But it is in their 'disposition,' *i.e.*, in an abstraction. The principle is, and remains, in the human thought. Who, then, gives us the right to transfer such a previously existing principle into those things which do not come to pass through human ingenuity, as, for example, the form of the human body? Is this form anything? Certainly in our conception. It is the way in which matter manifests itself, that is, the fashion in which it appears to us. Only, can this way in which the thing appears exist previously to the thing itself? Can it be separated from it?

As we see the opposition of form and matter, as soon as we go to the root of the matter, leads us back to the question of the existence of universals, for only as a universal could the form in general be regarded as having an existence of its own outside man's thinking faculty. And these Aristotelian modes of thought everywhere lead us back when we go thoroughly into things to Platonism, and as often as we find an opposition between Aristotelian empiricism and Platonic idealism, we have also a point before us in which Aristotle contradicts himself. Thus, in the doctrine of substance, Aristotle begins quite empirically with the substantiality of the individual concrete things. This notion is immediately refined away into the theory that the notional in the things, or the form, is substance. But the notional is the universal, and it is yet the determining element in its relation with the in itself quite undetermined matter. This is sensible enough in Platonism, which regards the individual things as futile appearances; but in Aristotle it remains an utter inconsistency, and is, therefore, of course, just as puzzling to the wise as to the foolish.[35]

If we now apply these remarks to the controversy

[35] See Prantl, Gesch. d. Logik im Abendl, iv. 184.

between the Nominalists and the Realists (*cf.* above p. 85 foll.), we understand that the origin of the individual must to the Realist have presented especial difficulties. The form as universal can produce no individual out of matter; whence therefore do we get a *principium individuationis*, to use scholastic language? Aristotle never gives us the answer to which we are entitled. Avicenna attempted to shift on to matter the principle of individuation, and that, therefore, whereby, from the notion of dog, this particular dog is produced—a device which involves either the fall of the whole Aristotelian notion of matter (and previously, of course, the Platonic), or the Platonic subversion of the individual. Here stumbled even St. Thomas, who otherwise contrived so carefully to avoid the errors of the Arabian commentators while employing their works. He laid the principle of individuation in matter and——became a heretic; for, as was shown by Bishop Stephan Tempier, this view conflicts with the doctrine of immaterial individuals, as the angels and departed souls.

Duns Scotus tried to help himself by the device of the notorious *Haecceitas*, which is often cited without much regard to the connection of the notions as the height of Scholastic absurdity. It does, in fact, seem an absurd idea to apply the individuality in turn for the purpose of obtaining a universal *ad hoc;* and yet this solution of the difficulty is, of all the expedients that have been proposed, the one most in harmony—or, let us rather say, the one least inconsistent—with the collective Aristotelian doctrine.

The Nominalists, however, found no great difficulty here. Occam very calmly explains that the principle of individuation lies in the individuals themselves, and this harmonises excellently with the Aristotle who makes individuals substances, but all the worse with the Platonising Aristotle, who invented the 'second substances' (notions of species and genus) and substantial forms. To

take the first Aristotle literally, means to reject the second Aristotle altogether. But the second is the reigning one, and that not only in Scholasticism, amongst the Arabians and the old commentators, but also in the genuine unadulterated Aristotelian system. And therefore, we may in fact regard Nominalism, and especially the Nominalism of the second Scholastic period, as the beginning of the end of Scholasticism. In the history of Materialism, however, Nominalism is of importance not only through its general opposition to Platonism and its recognition of the concrete, but also through perfectly distinct historical traces, which indicate that Nominalism did actually prepare the way for Materialism, and that it was chiefly and most strongly cultivated above all in England, where Materialism also later found its most vigorous development.

If the older Nominalism connects itself with the tenor of the Aristotelian categories against the Neo-Platonic commentators,[36] it cannot be doubted that the spread of the whole body of Aristotle's writings had a very great influence on the origin and extension of the later Nominalism. Once freed from the leading strings of Neo-Platonic tradition, and launched out on the high sea of the Aristotelian system, the Scholastics must soon have discovered so many difficulties in the doctrine of the universal, or, more fully expressed, the doctrine of word, notion, and thing, that innumerable attempts were made to solve the great problem. In fact, as Prantl has shown in his "Gesch. der Logik im Abendlande," instead of the three main conceptions (*universalia ante rem, post rem,* or *in re*), there appear the most manifold combinations and attempts at reconciliation; and the opinion that the 'universalia,' in fact, have their first origin in the human mind, is found isolated in writers who, on the whole, distinctly belong to Realism.[37]

[36] Comp. on this point, besides Prantl, in particular Barach, Zur Gesch. des Nominalism. vor Roscellin, Wien, 1866, where a very fully developed Nominalism is traced in a manuscript of the tenth century.

[37] So also in isolated passages Albertus Magnus; comp. Prantl, iii. 97 ff.

Besides the spread of Aristotle's writings, Averroism also may have had some influence, although, as the forerunner of Materialism, it is chiefly to be regarded from the standpoint of freethought; for the Arabian philosophy is, in spite of its leaning to naturalism, yet essentially realistic in the sense of the medieval factions, *i.e.*, it Platonises; and even its naturalism is fain to adopt a mystic colouring. But in so far as the Arabian commentators energetically raised the questions with which we are here concerned, and in general compelled men to increased independence of thought, they must indirectly have furthered Nominalism. The main influence nevertheless came from a quarter from which one at first sight would least expect it—from that Byzantine logic which has been so much decried on account of its abstract subtleties.[38]

It cannot indeed but surprise us that the very extreme of Scholasticism, that ultra-formal logic of the schools and of the sophistical dialectic, should be connected with that reawakening empiricism which ended by sweeping Scholasticism away; and yet we have traces of this connection lasting down to the present time. The most distinct empiricist among the chief logicians of our time, John Stuart Mill, opens his "System of Logic" with two utterances of Condorcet and Sir W. Hamilton bestowing high praise upon the Scholastics for the subtlety and precision

[38] The proof of the connection between the spread of the Byzantine logic in the West and the victory of Nominalism is one of the most valuable results of Prantl's "Geschichte der Logik im Abendlande." That Prantl himself designates the tendency of Occam, not as 'Nominalism,' but as 'Terminism' (from the logical 'terminus,' the chief implement of this school), is irrelevant to our purpose, as we only just touch the subject. Accordingly we still use 'Nominalism' in the wider sense of that body of opposition to Platonism which denies to 'universalia' the name of things. With Occam they are, of course, not 'names' but 'termini,' which represent the things comprehended in them. The 'terminus' is one element of a mentally formed judgment; it has no existence whatever outside the soul, but it is also not purely arbitrary, like the word by which it may be expressed, but it arises by a natural necessity in the contact of the mind with things. Comp. Prantl, iii. S. 344 ff. esp. Anm. 782.

which they have lent to the expression of thought in language. Mill himself adopts into his "Logic" several distinctions of various kinds in the signification of words which belong to the Scholasticism of those last centuries of the middle ages, which we are wont to regard as an unbroken chain of absurdities.

The riddle is, however, soon solved if we start with the consideration that it was a principal service of English philosophy since Hobbes and Locke to deliver us from the usurpation of idle words in speculation, and to connect our thoughts more with things than traditional expressions. But in order to attain this, the doctrine of the significance of words must be thoroughly comprehended, and be begun with a keen criticism of the relation of the word and its meaning. And to this end the Byzantine logic, in the development which it had attained in the West, and especially in the school of Occam, exhibits preliminary efforts which are still of positive interest.

That empiricism and logical formalism go hand in hand is in other respects, apart from this, by no means a rare phenomenon. The more our efforts are directed to allow of things acting on us as freely as possible, and to making experience and natural science the foundation of our views, the more shall we feel the necessity of connecting our conclusions with accurately defined signs for the things we mean to express, instead of allowing the ordinary forms of expression to bring in with them into our opinions the prejudices of past centuries and of the childish stages in the development of the human spirit.

It was not, of course, that the whole body of the Byzantine logic had originally been worked out as a conscious emancipation from the forms of language, but much rather as an attempt to follow to its consequences the supposititious identity of speech and thought. Yet the result could not but end in the emancipation of the precise expression of thought from the forms of speech. He who is still in these days disposed, with Trendelenburg, K. F.

Becker, and Ueberweg, to identify grammar and logic, might certainly have learnt much from the logicians of those ages, for they made earnest efforts at a logical analysis of all grammar, and in doing so at least succeeded in creating a new language, at whose barbarism the Humanists could never express sufficient horror.

In Aristotle the identification of grammar and logic is still naive, because in this case, as Trendelenburg has very rightly observed, both sciences sprang up from a common root: indeed, to Aristotle came certain penetrating gleams of light upon the distinction of word and notion, though they are not as yet sufficient to scatter the general darkness. There appear in his logic always only subject and predicate, considered as parts of speech, noun and verb, or the adjective and copula instead of the verb; in addition, negation, the words that indicate the extent to which the predicate applies to the subject, as 'all,' 'some,' and certain adverbs expressing the modality of propositions, The Byzantine logic, on the other hand, as it was created. as it spread in the thirteenth century over the West, had not only brought the adverb into play, enlarged the circle of the adverbs employed in logic, and treated the signification of the cases of the noun, but had above all things perceived and endeavoured to overcome the ambiguities which are brought in by the relation of the noun to the group of ideas that it denotes. These ambiguities are in Latin, which possesses no article, much more numerous than in German; as, for example, in the well-known example in which a drunken student says that he has not drunk 'vinum,' because he avails himself of the *reservatio mentalis* of understanding by 'vinum,' wine in its full extent, that is, all the wine that exists, and the wine that exists in India, or even in his neighbour's glass, he has, of course, not drunk. Such sophisms, indeed, formed the regular business of the late Scholastic logic, and its extravagance in this respect, as well as in the subtle application of the Scholastic distinctions, has rightly been condemned, and has often enough

helped the Humanists to victory in their contest with the Scholastics. Yet the main motive to this activity was a very serious one, and the whole problem will, perhaps, sooner or later, have to be taken up again—of course in another connection, and with another ultimate purpose.

The result of the great experiment was so far negative, that a perfect logic was not to be reached by this path, and a natural reaction against the extravagance of its artificiality soon caused the child to be thrown away together with the bath. And yet there was attained not merely a habit of precision in the expression of thought which had been 'unknown to the ancients,' as Condorcet says, but also a view of the nature of language admirably harmonising with empiricism.

Sokrates had thought that all words must originally have expressed as completely as possible the true nature of the things they denoted; Aristotle, in a moment of his empiricism, declared language to be conventional; the school of Occam tended, though it may have been without a full consciousness of it, to make the language of science conventional, that is, by an arbitrary fixing of the notions, to free it from the type of expressions that had become historical, and so to get rid of innumerable ambiguities and confusing by-notions. This whole process was, however, necessary if a science was to arise which, instead of creating everything out of the subject, should allow the things themselves to speak, whose language is often quite other than that of our grammars and dictionaries. This one circumstance alone makes Occam a most important forerunner of a Bacon, a Hobbes, and a Locke. This he was, moreover, by the greater activity of independent speculation, instead of mere repetition, which was part of his tendency; but above all, by the natural harmony of his logical activity with the bases of the old Nominalism, which in all 'universals' regards comprehensive terms only as the only substantial things, the only concrete, individual, sensible things existing outside human thought.

Nominalism was, for the rest, more than a mere opinion of the schools, like any other. It was really the principle of scepticism asserting itself against the whole medieval love of authority. Cultivated by the Franciscans in their standpoint of opposition, it turned the edge of its analytical modes of thought against the edifice of the hierarchy in the Church's constitution, just as it attacked the hierarchy of the intellectual world; and therefore we must not be surprised that Occam demanded freedom of thought, that in religion he held fast to the practical side, and that he, as did later his countryman Hobbes, threw the whole of theology overboard by declaring the doctrines of the faith to be incapable of proof.[39] His doctrine that science, in the last line, has no other subject-matter than the sensible particular, is in our day the foundation of Stuart Mill's "Logic;" and thus he expresses generally the opposition of the healthy human reason to Platonism, with a keenness which gives him a lasting significance.[40]

[39] Prantl, iii. 328. The demand for freedom of thought applies indeed only to philosophical principles (comp. the remarks in the following chapter about twofold truth in the middle ages); but as theology remains essentially only a province of belief, and not of knowledge, the demand applies to the whole sphere of scientific thought.

[40] At the same time Occam by no means mistakes the value of universal propositions. He teaches expressly that science is concerned with universals (and not directly with individual things), but yet it does not treat of universals as such, but merely as the expression of the particulars included in them. Prantl, iii. 332 foll. esp. note 750.

CHAPTER III.

THE RETURN OF MATERIALISTIC THEORIES WITH THE REGENERATION OF THE SCIENCES.

In the place of positive achievements, the domination of Scholasticism in the sphere of the sciences resulted only in a system of notions and terms, which was deeply rooted, and consecrated by many centuries. Progress had indeed to commence its work by shattering this system, in which were embodied the prejudices and fundamental errors of the traditional philosophy. Nevertheless, even the fetters of Scholasticism in their time rendered important services to the intellectual development of humanity. Like the theological Latin of the same period, so the formulas of Scholasticism formed a common element of intellectual intercourse for the whole of Europe. Apart from the formal exercise of thought, which remained very important and real even in the most degenerate form of the Aristotelian philosophy, this community of thought, which the old system had created, soon became an excellent medium for the propagation of new ideas. The period of the renascence of the sciences formed a connection among the learned men of Europe such as has never existed since. The fame of a discovery, of an important book, of a literary controversy, spread, if not quicker, at all events more generally and thoroughly, than in our own days, through all civilised countries.

If we reckon the whole course of the regenerative movement, whose beginning and end are difficult to fix, as from the middle of the fifteenth to the middle of the seventeenth century, we may then distinguish within this term

of two centuries four epochs, which, although not sharply marked off from each other, are nevertheless in their main features clearly distinguishable from each other. The first of them concentrates the chief interest of Europe upon philology. It was the age of Laurentius Valla, of Angelo Politiano, and of the great Erasmus, who forms the transition to the theological epoch. The dominion of theology is sufficiently indicated by the storms of the Reformation era: it suppressed for a long time almost all other scientific interests, especially in Germany. Then the natural sciences, which had been gaining strength since the beginning of the renascence in the quiet workshops of inquirers in the brilliant era of Kepler and Galilei, first took up a commanding and prominent position. Only in the fourth line came philosophy, although the culminating point of Bacon's and Descartes' activity in establishing principles falls not much later than the great discoveries of Kepler. All these epochs of creative labour were still exercising an unslackening influence upon their contemporaries, when the materialistic physic was again systematically developed, about the middle of the seventeenth century, by Gassendi and Hobbes.

In placing the regeneration of philosophy at the conclusion of this survey, we shall scarcely meet with any serious objection if we take the 'renascence,' the 'revival of antiquity,' not in a mere literal sense, but in the sense of the true character which belongs to this great and essentially homogeneous movement. It is a time which enthusiastically clings to the efforts and traditions of antiquity, but in which, at the same time, there are everywhere present the germs of a new, a great, and an independent period of thought. It might indeed be possible to separate from the 'renascence,' in the strict sense, this character of 'independence,' and the appearance of new and completely modern efforts and aims, and, with the names of Galilei and Kepler, Bacon and Descartes, to begin an entirely new period; but, as in all attempts to mark off

historical periods, we everywhere come upon intersecting threads and overlapping characteristics. Thus, as we shall see, Gassendi and Boyle, in the seventeenth century, take hands with the Atomism of the ancients, while Leonardi da Vinci and Luis Vives, undoubtedly men of the freshest type of the new movement, are already passed far beyond the traditions of antiquity, and attempt to found a science of experience in complete independence of Aristotle and the whole of antiquity.

Similarly, it is very difficult to mark off sharply the beginnings of the reflorescence of antiquity. We spoke above of the middle of the fifteenth century, because it was at that time that Italian philology attained its complete development, and that Humanism entered upon its struggle against Scholasticism. But this movement had its prelude a full century earlier in the era of Petrarca and Boccaccio, and we cannot deny that the new spirit which then showed itself in Italy may be traced at least as far back as the age of the Emperor Frederick the Second, whose importance we have ascertained in the first chapter of this section. In this connection, however, the transformation of Scholasticism through the knowledge of Aristotle and the spread of Arabian literature,[41] may also be regarded as one of the first and most important facts in the great process of regeneration. Philosophy, which forms the conclusion of the whole movement, and impresses its seal upon the completion of the great revolution, appears also at the beginning of the movement.

We have already seen, in the two last chapters, how, in the last centuries of the middle ages, under the influence of Arabian philosophy and Byzantine logic, there appeared now unbridled freethinking, and now painful struggle for

[41] Prantl. Gesch. d. Logik, iii. S. 1, remarks that it cannot be often enough pointed out "that the so-called revival of antiquity, as regards philosophy, mathematic and natural science, took place in great part as early as the thirteenth century, and chiefly through the knowledge then made possible of Aristotle and of Arabian literature.

liberty of thought. A special form of this abortive effort after liberty of thought is the doctrine of twofold truth, philosophical and theological, which may exist side by side in spite of their entire inconsistency. It is obvious that this doctrine is the true original of what has recently been called by a very ill-chosen but now firmly-rooted expression, 'book-keeping by double entry.'[42]

The chief seat of this doctrine in the thirteenth century was the University of Paris, where, even before the middle of the century, in fact, there appeared the curiously sounding doctrine, "that there have been many truths from eternity till now which were not God himself." A teacher at Paris, Jean de Brescain, excused himself in the year 1247 for his 'errors,' by observing that he had taught that the doctrines found heretical by the bishop as not 'theologically' but only 'philosophically' true. In spite of the bishop's absolute prohibition of all such subterfuges, the audacity of these 'merely philosophical' assertions appears to have gone on increasing. For in the years 1270 and 1276, there is another long series of such propositions condemned, the whole of which are of obviously Averroistic origin. The resurrection, the creation of the world in time, the changeableness of the individual soul, were denied in the name of philosophy, while it was at the same time admitted that all these doctrines are true 'according to the Catholic faith.' Their real attitude, however, by this freely admitted theological truth, appears by the circumstance that doctrines of the following kind appear among the condemned doctrines: "Nothing more can be known, because of the science of theology." "The Christian religion prevents us from learning anything more." "The only wise men in the world are the philoso-

[42] The facts will be found exhaustively given in Renan's Averroès (Paris, 1852), ii. 2, 3. A summary statement of all that specially relates to the doctrine of twofold truth is contained in Maywald, Die Lehre von der Zweifachen Wahrheit, ein Versuch der Trennung von Theologie und Philosophie im Mittelalter (Berlin, 1871).

phers." "The teachings of the theologians are based upon fables." [43]

It is true that we do not know the originators of these propositions. They may possibly in great part never have been maintained in books, at least, not with this publicity, but maintained only in lectures and disputations. But the way in which the bishops attack the evil shows plainly enough that the spirit which produced such doctrines was widely spread and venturesome. The modestly sounding statement that all this is only 'philosophically true,' taken in connection with doctrines that exalt philosophy far above theology, and find the latter a hindrance to science, is obviously nothing more than a shield against persecution, and a means of keeping open a retreat in case of a trial. It is clear, moreover, that there was at that time a party which did not occasionally, only when interpreting Aristotle, advance these propositions, but also put them forth deliberately in opposition to the orthodox Dominicans. The same spirit appeared also in England and Italy, where, in the thirteenth century, almost simultaneously with these events in Paris, exactly similar principles crop up and are condemned by the bishops.[44]

In Italy, at this time, Averroism was quietly taking deep root at the High School of Padua. It was this university that gave the intellectual tone to the whole northeast of Italy, and it was itself in turn under the influence of the statesmen and merchants of Venice, who were freethinking men of the world, with an inclination to practical Materialism.[45] Here Averroism held its ground,

[43] Maywald, Zweif. Wahrh., S. 11.; Renan, Averroès, p. 219.

[44] Maywald, S. 13; Renan, p. 208, where may be found also, after Hauréau, Philos. Scholast., some remarks on the connection of English Averroism with the Franciscan party.

[45] Renan, Averroès, p. 258: "Le mouvement intellectuel du nord-est de l'Italie, Bologne, Ferrare, Venise, se rattache tout entier à celui de Padoue. Les universités de Padoue et de Bologne n'en font réellement qu'une, au moins pour l'enseignement philosophique et medical. C'étaient les mêmes professeurs qui, presque tous les ans, émigraient de l'une à l'autre pour obtenir une augmentation de salaire. Padoue d'un autre côté, n'est que le quartier latin de Venise; tout ce qui s'enseignait à Padoue, s' imprimait à Venise."

although, to be sure, in company with the worshipping of Aristotle and all the barbarism of the Scholastics, until the seventeenth century; less controverted than at any other university, and on that account also seldomer mentioned. Like a 'strong fortress of barbarism,' Padua struggled against the Humanists, who, especially in Italy, almost all inclined to Plato, whose beautiful forms of language and conceptions charmed them, while they took care, with a few exceptions, not to lose themselves in the mystical side of Platonism. As against the Humanists, so the Scholastics of Padua, rationalistic indeed, but fettered by their traditions, struggled as long as they could against the physicists. Cremonini, the last of this school, taught at the University of Padua contemporaneously with Galilei: while the latter taught the Elements of Euclid for a trifling remuneration, Cremonini received a salary of 2000 gulden for his lectures on the scientific writings of Aristotle. It is said that when Galilei discovered the satellites of Jupiter, Cremonini would from that time never again look through a telescope, because the thing was contrary to Aristotle. But Cremonini was a freethinker, whose views as to the soul, although not strictly Averroistic, were certainly anything but ecclesiastical; and he maintained his right to teach anything that was in Aristotle with a firmness that deserves our recognition.[46]

One man in this series of scholastic freethinkers deserves to be specially mentioned here: Petrus Pomponatius, the author of a book which appeared in 1516 on the immortality of the soul. The question of immortality was at that time so popular in Italy, that the students of a newly-appointed professor, whose tendency they wanted to learn, called to him in his first lecture to discuss the soul.[47] And it does not appear that the orthodox doctrine was the favourite one; for Pomponatius, who, from beneath the shield of the doctrine of twofold truth, delivered per-

[46] Renan, Averroès, pp. 257, 326 foll. [47] Renan, Averroès, p. 283.

haps the boldest and acutest attacks upon immortality which were then known, was a very favourite teacher.

He was certainly not an Averroist; nay, he was the head of a school which engaged in a bitter war with the Averroists, and which quoted the commentator Alexander of Aphrodisias as the authority for its doctrines. But the apple of discord in this controversy was in reality only the doctrine of the soul and of immortality, and the 'Alexandrists' stood on all main points in the full current of Averroistic modes of thought. With regard, however, to the question of immortality, the 'Alexandrists' went more thoroughly to work; they rejected monopsychism, and declared the soul simply, "according to Aristotle," to be not immortal—the rights of the Catholic faith being at the same time reserved as already explained.

Pomponatius, in his book on immortality, adopts a very respectful attitude towards the Church. He zealously approves the confutation of Averroism by Saint Thomas. But all the more bold are the ideas conveyed in his own criticism of the question of immortality. The treatment is on the whole strictly Scholastic—the bad Latin inseparable from Scholasticism not excluded. But in the last section[48] of the work, where Pomponatius discusses "eight great difficulties" in the doctrine of immortality, he is by no means content with verbal expositions and quotations from Aristotle. Here all the scepticism of the age finds expression, even to the extent of very distinct approbation of the theory of 'the three impostors.'

[48] Cap. xiii. and xiv. In the last cap. (xv.) is expressed his submission to the judgment of the Church. There are *no* natural proofs of immortality, and it rests therefore solely upon revelation. The strongest passages are in pp. 101 until near the end in the edition of Bardili (Tübingen, 1791), pp. 118 foll. in an edition without any place, 1534. The earlier editions are unknown to me. The passages quoted in my first edition were taken from M. Carriere, Die Philos. Weltanschauung der Reformationszeit, Stuttg. u. Tüb., 1847. They are, indeed, in essential points faithful, but are freer than is necessary, and the somewhat pathetic and elevated tone is foreign to the original.

Pomponatius here considers the mortality of the soul as philosophically proved. The eight difficulties of the doctrine are the commonest general arguments for immortality; and these arguments Pomponatius refutes no more on the Scholastic method, but by sound common sense and by moral considerations. Among these difficulties the fourth runs thus: Since all religions ("omnes leges") maintain immortality, then if there is really no such thing, the whole world is deluded. To this, however, the answer is: That almost every one is deluded by religion must be admitted; but there is no particular misfortune in that. For as there are three laws—those of Moses, Christ, and Mohammed,—they are either all three false, and then the whole world is deluded—or two at least are false, and then the majority are deluded. We must know, however, that according to Plato and Aristotle, the legislator ("politicus") is a physician of the soul, and as the legislator is more concerned to make men virtuous than to make them enlightened, he must adapt himself to their different natures. The less noble require rewards and punishments. But some cannot be kept in check by these, and it is for them that immortality has been invented. As the physician says what is not true,—as the nurse allures the child to many things of which it cannot as yet understand the true reason: so acts the founder of a religion, and is completely justified in so acting, his final end being regarded as a purely political one.

We must not forget that this view was very widely held among the upper classes in Italy, and especially among practical statesmen. Thus Macchiavelli speaks in his Discourses on Livy:[49] "The princes of a republic or a kingdom must maintain the pillars of the religion they hold. If this is done, it will be an easy thing for them to keep their state religious, and therefore in prosperity and unity. And everything that favours their interests, even

[49] Comp. Macchiavelli, Erörter. über d. Erste Decade des T. Livius, überg. von Dr. Grutzmacher, Berlin, 1871, S. 41.

although they hold it to be false, they must favour and assist, and must do so all the more, the more prudent and politic they are. And as this conduct of the wise has been observed, the belief in miracles has arisen, which are exalted by religion, although they are equally false, because the prudent magnify them, no matter what their origin may have been, and then the respect paid to them by these men secures them universal belief." Thus Leo X. may have very well said within himself, when preparing to sit in judgment on Pomponatius's book: "The man is quite right, if only it would make no scandal!"

To the third objection, that if our souls were mortal there could be no just ruler of the world, Pomponatius replies: "The true reward of virtue is virtue itself, which makes man happy; for human nature can have nothing higher than virtue, since it alone makes man secure and free from all disturbances. In the virtuous man all is in harmony; he has nothing to fear or hope, and remains unmoved in fortune or misfortune. To the vicious man vice itself is punishment. As Aristotle shows in the seventh book of the Ethics, to the vicious man everything is spoiled. He trusts nobody; he has no rest, waking or sleeping; and leads, in tortures of soul and body, such a miserable life, that no wise man, however poor and weak he may be, would choose the life of a tyrant or a vicious aristocrat."

Spiritual apparitions are explained by Pomponatius to be the delusions of the excited fancy or the deceptions of priests. The 'possessed' are sick (Object. 5 and 6). At the same time, he admits a residuum of these appearances, and refers them to the influence of good and evil spirits, or to astrological causes. Belief in astrology was indissolubly bound up with the Averroistic rationalism.

In conclusion, Pomponatius protests with great energy against those persons (Object. 8) who maintain that vicious and guilty men commonly deny the immortality of the soul, while good and upright men believe it. On the

contrary, he says, it is quite obvious that many vicious persons believe in immortality, and at the same time allow themselves to be carried away by their passions, while many righteous and noble men have held the soul to be mortal. Among these he reckons Homer and Simonides, Hippokrates and Galen, Alexander of Aphrodisias and the great Arabian philosophers; finally, of our own countrymen ('ex nostratibus,' here we see, even in the Scholastic, the spirit of the renascence!), Pliny and Seneca.

In a similar spirit Pomponatius wrote of the freedom of the will, and boldly set forth its inconsistencies. Here, in fact, he criticises the Christian idea of God as he acutely tracks out and exposes the contradiction between the doctrine of the omnipotence, omniscience, and goodness of God, and the responsibility of man. In a special treatise, moreover, Pomponatius attacked the belief in miracles, where it is indeed true that we must also take astrological influences, as natural and actual facts, as part of our bargain. Thus it is genuinely Arabian, for example, when he refers the gift of prophecy to the influence of the stars and to a mysterious communion with unknown spirits.[50] On the other hand, the efficacy of relics depends upon the imagination of the credulous, and would be just as great if the relics were the bones of a dog.

There has been some controversy whether, in regard to these views of Pomponatius, his submission to the Catholic faith was more than a mere form. Such questions are, it is very true, in many similar cases extremely difficult to decide, since we are in no way justified in applying to them the standard of our own time. The immense respect for the Church—increased by so many a stake and auto-da-fé—was quite sufficient to shed a holy awe about the creed, even in the minds of the boldest thinkers—an awe which veiled in impenetrable cloud the border-line between word and fact. But in what direction Pomponatius

[50] Maywald, Lehre von d. Zweif. Wahrh., S. 45 ff.

made the tongue of the balance incline in this contest between philosophical and theological truth, he has sufficiently indicated for us when he declares the philosophers alone to be the gods of the earth, and as far removed from all other men, of whatever condition, as real men are from painted men!

This equivocal character of the relation between faith and knowledge is in many ways a characteristic and constant feature of the period of transition to the modern freedom of thought. Nor could even the Reformation discard it; and we find it, from Pomponatius and Cardan down to Gassendi and Hobbes, in the most various gradations, from timidly-concealed doubt to conscious irony. In connection with it appears the tendency to an equivocal defence of Christianity, or of individual doctrines, which loves to turn the darker side outwards; and there are instances as well of obvious intention to produce an unfavourable conviction, as in Vanini, as also cases such as that of Mersenne's "Commentary on Genesis," where it is hard to say what is the precise object.

Any one who finds the essential element of Materialism in its opposition to the belief of the Church, might reckon Pomponatius and his numerous more or less bold successors among the Materialists. If, on the contrary, we seek the beginnings of a positive Materialistic interpretation of nature, we shall fail to find any rudiment of such an interpretation even amongst the most enlightened Scholastics. A single, and an as yet quite unique, instance that may be thus reckoned appeared, indeed, as early as the fourteenth century. In the year 1348, at Paris, Nicolaus de Autricuria[51] was compelled to make recantation of several doctrines, and amongst others, this doctrine, that *in the processes of nature there is nothing to be found but the motion of the combination and separation of atoms.* Here, then, is a formal Atomist in the very heart

[51] Prantl, Gesch. d. Logik im Abendl., iv. S. 2 foll.

of the dominion of the Aristotelian theory of nature. But the same bold spirit ventured also upon a general declaration that we should put Aristotle, and Averroes with him, on one side, and apply ourselves directly to things themselves. Thus Atomism and Empiricism here go hand in hand together!

In reality, the authority of Aristotle had first to be broken before men could attain to direct intercourse with things themselves. While, however, Nicolaus de Autricuria, in complete isolation, so far as we yet know, was making a fruitless effort in this direction, there began about the same time in Italy the prelude to the great struggle between Humanists and Scholastics in Petrarca's violent assaults.

The decisive struggle fell in the fifteenth century, and although, on the whole, the relations to Materialism are somewhat distant — since the great Italian Humanists were for the most part Platonists—it is nevertheless interesting to observe that one of the earliest champions of Humanism, Laurentius Valla, first made himself extensively known by a "Dialogue on Pleasure," which may be regarded as the first attempt at a vindication of Epikureanism.[52] It is true that in the issue the representative in the dialogue of Christian ethic carries off the victory over the Epikurean as over the Stoic; but the Epikurean is treated with a visible liking, which is of great weight in view of the general horror of Epikureanism which was still prevalent. In his attempts to reform logic, Valla was not always fair to the subtleties of Scholasticism, and his own treatment tinges logic very strongly with rhetorical elements. Yet the undertaking was of great historical importance, as the first attempt at a serious criticism which not only attacked the corruptions of Scholasticism, but did not shrink even before the authority of Aristotle himself. Valla is in other provinces also one of the first leaders of awakening criticism. His appearance is in

[52] Comp. Lorenzo Valla, ein Vortrag von J. Vahlen. Berlin, 1870. S. 6 foll.

every respect a sign of the end of the unconditional dominion of tradition and infallible authorities.

In Germany, the Humanist movement, powerfully as it had begun, was early and completely absorbed by the theological movement. The very circumstance that here the opposition made the most decided and open break with the hierarchy, perhaps brought with it that the scientific department was partly neglected, partly treated in a more conservative spirit than elsewhere. It was only after the lapse of centuries that the attainment of liberty of thought atoned for this sacrifice.

It was Philip Melanchthon who presented the most decided example for the reform of philosophy on the old foundation of Aristotle. He gave out openly that he intended to introduce into philosophy, by going back to the genuine writings of Aristotle, a reform like that intended for theology by Luther in going back to the Bible.

But this reform of Melanchthon's did not, on the whole, result for the good of Germany. It was, on the one hand, not radical enough; for Melanchthon himself, with all his subtlety of thought, was thoroughly hampered by the fetters of theology, and even of astrology. On the other hand, the immense weight of the reformer and the influence of his academical activity brought about in Germany a return to Scholasticism, which lasted until long after Descartes, and formed the chief hindrance to philosophy in Germany.

It is worth observing, however, that Melanchthon introduced regular lectures upon psychology with his own textbook. His views often border closely enough upon Materialism, but are everywhere restrained within narrow limits by the doctrine of the Church, without any attempt at deeper reconciliation. The soul was explained by Melanchthon, after the false reading *ἐνδελέχεια* for *ἐντελέχεια*, as the uninterrupted; a reading upon which chiefly rested the assumption that Aristotle believed in the immortality of the soul. Amerbach, the professor at Wit-

tenberg who wrote a strictly Aristotelian Psychology, was so embroiled with the reformer over this reading, that he left Wittenberg in consequence, and became a Catholic again.

A third treatise on psychology appeared about the same time from the hand of the Spaniard Luis Vives.

Vives must be regarded as the most important philosophical reformer of this period, and as a forerunner of Descartes and of Bacon. His whole life was an uninterrupted and successful struggle against Scholasticism. With regard to Aristotle, his view was that the genuine disciples of his spirit should go beyond him, and interrogate nature herself, as the ancients had done. Not out of blind traditions nor subtle hypotheses is nature to be known, but through direct investigation by the method of experiment. In spite of this unusual clearness as to the true foundations of inquiry, Vives seldom appeals in his Psychology to the facts of life in order to communicate the observations of himself and others. The chapter on the immortality of the soul is written in a thoroughly rhetorical style, and founds what is offered as an irrefutable argument on the slenderest proofs—in what has continued down to our own day to be a favourite fashion. And yet Vives was one of the clearest heads of his century, and his psychology, especially in the doctrine of the emotions, abounds in subtle observations and happy appreciations of character.

The honest naturalist of Zürich, Konrad Gessner, also wrote a Psychology about this time, which is interesting in its contents and treatment. After an extremely concise, almost tabular, statement of all possible views as to the nature of the soul, follows abruptly a detailed doctrine of the senses. Here Gessner feels himself at home, and lingers complacently in physiological expositions, which are in part of a very thorough character. It produces a very curious impression, on the other hand, if we cast a glance at the same time over the fearful chaos of

theories and opinions on the soul in the first part of the work. "Some hold," as Gessner tells us, with imperturbable calm, "the soul to be nothing; some hold it to be a substance." [53]

On all sides, then, we see the shaking of the old Aristotelian tradition, the unsettling of opinions, and the exciting of doubts, which probably only exhibit themselves very partially in literature. But very soon psychology, which was treated in such an extraordinary number of works from the end of the sixteenth century, again becomes systematised, and the fermentation of the period of transition makes room for a dogmatic Scholasticism, whose chief object it is to reconcile itself with theology.

But while theology still held full dominion over the sphere of mind, and violent controversies drowned the voice of calm judgment, rigid inquiry was quietly laying in the province of external nature an impregnable basis for an entirely revolutionised theory of the universe.

In the year 1543 appeared, with a dedication to the Pope, the book on the "Orbits of the Heavenly Bodies," by Nicolaus Copernicus of Thorn. Within the last days of his life the grey-headed inquirer received the first copy of his book, and then in contentment departed from the world.[54]

What now, after the lapse of three centuries, every school child must learn, that the earth revolves upon its own axis and round the sun, was then a great, and, despite a few forerunners, a new truth, diametrically opposed to the general consciousness. It was, however, a truth which contradicted Aristotle, and with which the Church had not yet reconciled herself. What to some extent sheltered the doctrine of Copernicus against the scorn of the

[53] All the psychological treatises of the Reformation period here mentioned appeared printed together in a single volume through Jacob Gessner at Zürich in 1563; the three first named also at Basel. Compare the articles "Seelenlehre" and "Vives" in the Encl. des ges. Erzieh.- und. Unterrichtswesens.

[54] Comp. Humboldt's Kosmos, ii. S. 344 (E. T. ed. Ott6, ii. 684, and note), and Anm. 22, S. 497 foll.

conservative masses, against the Scholastic and ecclesiastical fanaticism, was the rigidly scientific form and the superfluity of proof of the work, on which the author had laboured, in the quiet leisure of his prebendal stall at Frauenburg, with admirable patience for three-and-thirty years. There is something really great in the thought that a man who is seized in the period of fiery creativeness by a world-stirring idea, with full consciousness of its range, should retire in order to devote the whole of his future life to the calm working out of this idea. And this explains the enthusiasm of his few earliest disciples, as well as the discomposure of the pedants and the reserve of the Church.

How critical the undertaking appeared in this aspect is shown by the circumstance that Professor Osiander, who carried the book through the press, in the customary preface added by him represented the whole doctrine of Copernicus as a hypothesis. Copernicus himself had no share in this concealment. Kepler, himself animated by haughty freedom of thought, calls him a man of free spirit; and, in fact, only such a man could have completed the gigantic task.[55]

[55] Humboldt's Kosmos, ii. S. 345 (E. T. ii. 686). "An erroneous opinion unfortunately prevails, even in the present day, that Copernicus, from timidity and from apprehension of priestly persecution, advanced his views regarding the planetary movement of the earth, and the position of the sun in the centre of the planetary system, as mere *hypotheses*, which fulfilled the object of submitting the orbits of the heavenly bodies more conveniently to calculation, 'but which need not necessarily be either true, or even probable.' These singular words do certainly occur in the anonymous preface attached to the work of Copernicus, and inscribed, *De hypothesibus hujus operis;* but they are quite contrary to the opinions expressed by Copernicus, and in direct contradiction with his dedication to Pope Paul III." The author of the preface, according to Gassendi, was Andreas Osiander; not indeed, as Humboldt says, "a mathematician then living at Nuremberg," but the well-known Lutheran theologian. The astronomical revision of the proofs was undoubtedly done by Johannes Schoner, professor of mathematics and astronomy in Nuremberg. To Schoner and Osiander the charge of the printing was assigned by Rhäticus, professor at Wittenberg, and a pupil of Copernicus, because he considered Nuremberg to be a "more suitable" place of publication than Wittenberg (Humboldt's Kosmos, Anm. 24 to passage above quoted, ii. S. 498, E. T. at p. 686). These proceedings were, in all proba-

"The earth moves" became speedily the formula by which belief in science and in the infallibility of the reason was distinguished from blind adherence to tradition. And when, after a struggle of centuries, the victory in this matter had definitively to be yielded to science,

bility, very largely influenced by consideration for Melanchthon; for he devoted himself with predilection to astronomy and astrology, and was one of the keenest opponents of the Copernican system.

At Rome there was at that time greater freedom, and the order of the Jesuits must first be founded in order to render possible the burning of Giordano Bruno and the trial of Galilei. With regard to this change, Ad. Franck observes, in his notice of Martin's Galilée (Moralistes et Philosophes, Paris, 1872, p. 143): "Chose étrange! le double mouvement de la terre avait déjà été enseigné, au xvᵉ siècle, par Nicolas de Cus, et cette proposition ne l'avait pas empêché de devenir cardinal. En 1533, un Allemand, du nom de Widmannstadt, avait soutenu la même doctrine à Rome, en présence du Pape Clement VII., et le souverain pontife, entemoignage de sa satisfaction, lui fit présent d'un beau manuscrit grec. En 1543 un autre pape, Paul III., acceptait la dédicace de l'ouvrage où Copernic développait son système. Pourquoi donc Galilée, soixante et dix ans plus tard, rencontrait-il tant de résistance, soulevait-il tant de colères?" The contrast is very happily put, but the solution is very unhappy if Franck thinks that the difference consists in this, that Galilei does not content himself with pure mathematical abstractions, but (with a disparaging reflection upon the speculations of Kepler!) called to his assistance actual observation and experience. As a matter of fact, whatever may have been the differences of their character and talents, Copernicus, Kepler, and Galilei worked in precisely the same spirit of scientific reform, of progress, and the breaking down of narrowing prejudices, without any regard to the limit separating the learned world and the common people. We will, therefore, not omit to quote the following passage — one which does its author honour—from Humboldt's Kosmos, ii. S. 346, E. T. ii. 687: "The founder of our present system of the universe was almost more distinguished, if possible, by the intrepidity and confidence with which he expressed his opinions, than for the knowledge to which they owed their origin. He deserves to a high degree the fine eulogium passed upon him by Kepler, who, in the introduction to the Rudolphine Tables, calls him 'the man of free soul;' 'vir fuit maximo ingenio et quod in hoc exercitio (combating prejudices) magni momenti est, animo liber.' When Copernicus is describing, in his dedication to the Pope, the origin of his work, he does not scruple to term the opinion generally expressed amongst theologians of the immobility and central position of the earth an 'absurd acroama,' and to attack the stupidity of those who adhere to so erroneous a doctrine. 'If ever,' he writes, 'any empty-headed babblers (*ματαιολόγοι*), ignorant of all mathematical science, should take upon themselves to pronounce judgment on his work, through an intentional distortion of any passage in the holy Scriptures (propter aliquem locum Scripturae male ad suum propositum detortum), he should despise so presumptuous an attack!'"

this threw a weight into the scale in its favour, as though it had first given movement by a miracle to the hitherto motionless earth.

One of the earliest and most decided adherents of the new system of the world, the Italian Giordano Bruno, is a thorough philosopher; and although his system as a whole must be described as pantheistic, it is, nevertheless, in so many ways related to Materialism, that we must not omit its consideration.

While Copernicus clung to Pythagorean traditions[56]—the Index Congregation later described his whole doctrine as simply a *doctrina Pythagorica*—Bruno took Lucretius as his model. He very happily selected the ancient Epikurean doctrine of the infinity of worlds, and taught, combining it with the Copernican system, that all fixed stars are suns, which extend in infinite number throughout space, and have in turn their invisible satellites, which are related to them just as the earth is to the sun or the moon to the earth; a theory which, as against the old assumption of limited space, is of almost as much importance as the doctrine of the revolution of the earth.[57]

"The infinity of forms under which matter appears," taught Bruno, "it does not receive from another and something external, but produces them from itself, and engen-

[56] I may take this opportunity of adding a supplementary remark to what has been said of Copernicus and Aristarchos of Samos on pp. 117, 118. That Copernicus was acquainted with the view of the ancient astronomer, is (according to Humboldt, Kosmos, ii. S. 349 ff., E. T. ii. 691) not improbable; he refers, however, expressly to two passages of Cicero (Acad. Qu. iv. 30) and Plutarch (De Placitis Philos., iii. 13), which first set him thinking as to the possible revolution of the earth. In Cicero the opinion of Hiketas of Syracuse is referred to; and in Plutarch, that of the Pythagoreans Ekphantos and Herakleides. That he was first incited to inquiry by the ideas of Greek antiquity is rendered quite certain, therefore, by Copernicus's own statements; but at the same time he nowhere refers to Aristarchos in particular. Comp. Humboldt, *loc. cit.*, and Lichtenberg, Nicolaus Copernicus, in fifth vol. of Vermischte Schriften (Neue Original-Ausgabe, Göttingen, 1844), S. 193 ff.

[57] Bruno is not only very fond of quoting Lucretius, but he also sedulously imitates him in his didactic poem "De Universo et Mundis." His 'Polemic against the Aristotelian Cosmology' is discussed by Hugo Wernekke (Leipziger Dissert., printed Dresden, 1871).

ders them from its bosom. Matter is not that *prope nihil* which some philosophers have wished to make it, and as to which they have so much contradicted each other; not that naked, mere empty capacity, without efficiency, completeness, and fact. Even though it has no form of its own, it is not at least deprived of it, as ice is of heat, or as the depths are of light, but it is like the travailing mother as she expels her offspring from her bosom. Even Aristotle and his successors make the forms proceed from the inward potency of matter, rather than be produced in it after a kind of external fashion: but instead of finding this active potency in the inward fashioning of the form, they have recognised it for the most part only in the developed reality, seeing that the complete sensible appearance of a thing is not the principal ground of its existence, but only a consequence and effect of it. Nature produces its objects not by substraction and addition, like human art, but only by separation and unfolding. Thus taught the wisest men among the Greeks, and Moses, in describing the origin of things, introduces the universal efficient Being thus speaking: "Let the earth bring forth the living creature; let the waters bring forth the moving creature that hath life;" as though he said, Let matter bring them forth. For according to Moses the material principle of things is water, and therefore he says that the actively formative reason, which he calls 'spirit,' moved upon the face of the waters, and the creation was brought about through its imparting to them strength to bring forth. And so they are all of opinion that things arise, not by composition, but by separation and development, and therefore matter is not without forms—nay, it contains them all, and since it unfolds what it carries concealed within itself, it is in truth all nature and the mother of all living things." [58]

[58] This passage is taken from Moritz Carriere, Die philos. Weltansch. der Reformationszeitt in ihren Bez. zur Gegenwart, Stuttg. u. Tüb. 1847, S. 426, 427. In this thoughtful work Bruno is treated with special liking. Comp., besides, Bartholmèss, Jordano Bruno, Paris, 1846, 2 vol.

If we compare this definition, which is declared by Carriere to be one of the most important facts in the history of philosophy, with that of Aristotle, we find this great and decisive difference: that Bruno conceived matter not as the *potential* but as the *actual* and *active*. Aristotle also taught that form and matter in things are one; but as he defined matter as mere potentiality of becoming all that form may make of it, real substantiality belonged to the latter only. These definitions were reversed by Bruno. He makes matter the true essence of things, and makes it bring forth all forms out of itself. This principle is Materialistic, and we should therefore be fully justified in claiming Bruno entirely for Materialism, but that his development of his system assumes a Pantheistic turn on certain decisive points.

Even Pantheism, it is true, is in itself only a modification of some other Monistic system. The Materialist who defines God as the sum of all animated matter becomes at once a Pantheist without giving up his Materialistic views. But the natural consequence of directing the spirit to God and to divine things is usually this, that the starting-point is forgotten; that our treatment of the subject more and more tends to conceive the soul of the universe not as itself necessarily implicated in matter, but as at least in thought the prime creative principle. In this wise even Bruno developed his theology. He made such a compromise with the Bible, that he taught that, as the Bible was intended for the people, it was obliged to adapt itself even to their notions of natural history, since otherwise it would never have found any acceptance.[59] Bruno was poetical in his way of expressing himself; the greater

[59] Carriere, Weltansch. der Reformationszeit, S. 384. This distinction, one already employed by the Arabian philosophers, between the ethical purpose of the Bible and its way of speaking in accordance with the views of the time at which it was written, is found also in Galilei again in his letter to the Grand-Duchess Christine: "De sacrae Scripturae testimoniis in conclusionibus mere naturalibus, quae sensata experientia et necessariis demonstrationibus evinci possunt temere non usurpandis."

number of his works are poetical in form, written partly in Latin, partly in Italian. His profound spirit was ever ready to lose itself in a mystic darkness of contemplation; but, again, with equal boldness and recklessness, he ventured also to express his opinions with absolute clearness.

Bruno had originally entered the order of the Dominicans, in order to find leisure for his studies; but having become suspected of heresy, he was obliged to flee, and from that time forward his life was unsettled, and marked by a long chain of persecutions and hostilities. He stayed in turn at Geneva, at Paris, in England and in Germany, at last to venture on the fatal step of returning to his native land. In the year 1592, at Venice, he fell into the hands of the Inquisition.

After many years' confinement, he was condemned at Rome, still unbowed and firm in his convictions. After being degraded and excommunicated, he was handed over to the secular authorities, with the request that they would "punish him as mercifully as possible, and without shedding of blood;" the well-known formula which meant that he was to be burnt. When his sentence was announced to him, he said: "I suspect you pronounce this sentence with more fear than I receive it." On the 17th February 1600, he was burnt in the Campofiore at Rome. His doctrines have undoubtedly exercised a great influence upon the succeeding developments of philosophy, although he fell into the background after the appearance of Descartes and Bacon, and, like so many great men of the Transition period, became forgotten.

It was reserved for the first half of the seventeenth century to reap in the sphere of philosophy the ripe fruits of the great emancipation which the Renascence had secured in turn for the most various departments of man's intellectual life. In the first decades of the century Bacon made his appearance, towards its middle came Descartes; his contemporaries were Gassendi and Hobbes, whom we

must regard as the true revivers of a Materialistic philosophy. But besides this, the two more famous 'restorers of philosophy,' as they are usually styled, Descartes as well as Bacon, stand in a close and remarkable relationship to Materialism.

With regard to Bacon in particular, it would be almost more difficult in an exhaustive inquiry to prove sharply and clearly in what he differs from Materialism, than to show what he has in common with it.

Among all philosophical systems, Bacon places that of Demokritos highest. He asserts in his praise that his school had penetrated deeper than any other into the nature of things. The study of matter in its manifold transformations carries us farther than Abstraction. Without the assumption of atoms nature cannot be well explained. Whether final causes operate in nature cannot be definitely decided; at all events, the inquirer must confine himself to efficient causes only.

It is very common to carry back to Bacon and Descartes two opposing lines of philosophy, one of which stretches from Descartes through Spinoza, Leibniz, Kant, and Fichte to Schelling and Hegel; while the other runs from Bacon through Hobbes and Locke to the French Materialists of the eighteenth century; indirectly therefore, we must trace upon this latter line the Materialism of our own days.

And it is, in fact, merely accidental that the name of Materialism appeared first only in the eighteenth century; we have the thing in all essential respects already in Bacon, and we are only restrained from designating Bacon as strictly the restorer of the Materialistic philosophy by the circumstance that he fixed his attention almost exclusively upon method, and that he expresses himself upon the most important points with equivocal reserve. The vain and superstitious absence of science [60] in Bacon

[60] In this respect, the crushing judgment of Liebig (Ueber Francis Bacon von Verulam und die Methode der Naturforschung, München, 1863)

agrees in itself with the Materialistic philosophy—not indeed better, but also not worse, than with most other systems. Only, as to the extensive use which Bacon makes of 'spirits' (spiritus) in his natural philosophy, we may offer a few observations.

Bacon leans here upon tradition, but with a self-sufficiency in his treatment which did little honour to the 'restorer of the sciences.' 'Spirits' of all kinds play a great part in the cosmology and physiology of the Neo-Platonic-Scholastic philosophy; especially, too, among the Arabians, where the spirits of the stars govern the world by means of mystical sympathies and antipathies with the spirits that inhabit earthly things. The doctrine of 'spiritus' took scientific shape chiefly in psychology and physiology, in which its effects may be traced even to the present (for example, in the notion of the slumbering, waking, or excited 'animal spirits'). On this head Galen's theory of the psychical and animal 'spiritus' in connection with the doctrine of the four humours and the temperaments was very early in the Middle Ages fused

cannot be softened by any reply (see the literature in Ueberweg, Grundriss, iii. S. 39, 3 Aufl., E.T.=Hist. of Phil. ii. 35–6); the facts are too forcible. The most frivolous dilettanteism in his own scientific experiments, the degradation of science to hypocritical courtliness, ignorance or misapprehension of the great scientific achievements of a Copernicus, a Kepler, a Galilei, who had not waited for the 'Instauratio Magna,' malignant hostility and depreciation of real inquirers in his immediate neighbourhood, such as Gilbert and Harvey—these are points enough to display Bacon's scientific character in as unfavourable a light as his political and personal character, so that the view of Macaulay (Critical and Historical Essays, 'Lord Bacon') already properly controverted by Kuno Fischer (Baco von Verulam, Leipzig, 1856, S. 5 ff.), has lost all support. Less simple is the judgment upon Bacon's method. Here Liebig has certainly emptied bath and babe together, although his critical remarks on the theory of induction (comp. also "Induction und Deduction," München, 1865) contain extremely valuable contributions to a complete theory of scientific method. And yet it is worthy of attention that thoughtful and learned writers on method like W. Herschel (Introd. to the Study of Natural Philosophy, 1832) and Stuart Mill, still regard Bacon's theory of induction as the first although inadequate foundation of their own theory. It is quite right that we have recently begun to recall the forerunners of Bacon in Methodology, such as Leonardo da Vinci, Luis Vives, and especially Galilei; and yet here again we must beware of such exaggerations as that, for instance, in Ad. Franck, Moral-

with the Aristotelian psychology. According to this doctrine, which may be found at full length even in Melanchthon's Psychology, the four fundamental humours are prepared in the liver (second organic process after the first has taken place in the stomach); out of the noblest humour, the blood, the 'spiritus vitalis' is prepared by a new process in the heart; and this is finally (the fourth and last process) in the cavities of the brain refined into the 'spiritus animalis.'

This theory probably owed the deep hold which it obtained chiefly to the fact that it seemed to superficial thought a sufficient bridging over of the gulf between the sensible and the supersensible, a need which was felt as well by the Neo-Platonists as by the Christian theologians. Thus, for example, we find still in Melanchthon that the material and gradually refined 'spiritus' is the immediate bearer of influences, which in theory should be purely spiritual, but which, in fact, are represented by this learned theologian in very material fashion. Thus the divine spirit mingles with these vital and animal spirits of man; but if a devil has his abode in the heart, he blows upon the spirits and brings them into confusion.[61]

To really logical thought the gulf is, of course, equally

istes et Philosophes, Paris, 1872, p. 154: "La méthode de Galilée, antérieure à celle de Bacon et de Descartes, leur est supérieure à toutes deux." Moreover, we must not overlook the simple fact that, Bacon's great reputation did not proceed from a later historical misapprehension, but that it has come down through a constant tradition from his contemporaries down to ourselves. This justifies us in asserting the extent and the intensity of his *influence*, and this influence, despite all the weaknesses of his doctrines, yet essentially resulted in advantage to scientific progress and the importance of the natural sciences. If, then, in addition to his powerful style and the kindling flashes of light in Bacon's works, we also take into account the authority of his exalted rank, and the fact that he, with a happy appreciation, gave its proper watchword to the age, we shall be doing nothing to depreciate his historical importance.

[61] Comp. the following passage at the end of the physiological part (p. 590 of the Zürich edition): "Galenus inquit de anima hominis: nos spiritus aut animam esse, aut immediatum instrumentum animae. Quod certe verum est, et luce sua superant solis et omnium stellarum lucem. Et quod mirabilius est, his ipsis spiritibus in hominibus piis *miscetur* ipse divinus spiritus, et efficit magis fulgentes divina luce, ut agnitio Dei sit illustrior et assensio firmior, et

great between the supersensible and the finest particle of the finest matter, or the whole globe. The spirits of the modern 'spiritualists' of England and America, are therefore quite right when they shake their believers roughly by the coat-sleeve, or when they career around a room with heavy furniture.

But by the side of this modest, and in form, at least, rigidly scientific doctrine of the vital spirits in the animal organism, there stands the fantastic doctrine of the astrologers and alchemists, which resolves the essence of all things into the workings of such spirits, and thus destroys all distinction between the sensible and the supersensible. We may indeed maintain that the 'spirits' of this theory of nature are absolutely material, and identical with what we nowadays call forces; but even leaving out of sight that in this very notion of force there still perhaps lurks a remnant of this same want of clearness, what shall we think of a kind of matter that acts upon other material things, not by pressure and collision, but by *sympathy?* We have only to add to this, that the idea of nature held by the astrologers and alchemists in its more fantastic forms attributed even to inanimate things a kind of *consciousness,* and we shall no longer find it a very great step to Paracelsus, who conceived the 'spiritus' anthropomorphically, and peopled all the details of the world, both great and small, with innumerable demons, from whom all life and all activity proceed.

And now as to Bacon. To all appearance, indeed, he took up a tolerably decided opposition to the alchemistical theory of nature. He repeatedly treats the spirits as matter and material forces, so that we might believe that the Materialism of Bacon is nowhere to be more clearly seen than in his doctrine of the 'spiritus.' If we look, however, a little closer, we find that he not only adopts into his

motus sint ardentiores erga Deum. ——E contra, ubi diaboli occupant corda, *suo afflatu* turbant spiritus in corde et in cerebro, impediunt udicia, et manifestos furores efficiunt, et impellunt corda et alia membra ad crudelissimos motus." Comp. Corpus Reformatorum, xiii. 88 sqq.

theory all kinds of superstitious assumptions from the wisdom of the Kabbalists, but that even his Materialistic rendering of magic into 'natural' phenomena is extremely threadbare, and often enough is an entire failure. Thus, for instance, Bacon does not hesitate to attribute to bodies a sort of power of conception, to make the magnet "perceive" the neighbourhood of the iron, and to exalt the "sympathy" and "antipathy" of the "spiritus" into a cause of natural phenomena; and accordingly the "evil eye," the sympathetic rubbing of warts, and so on, fit admirably into this kind of natural science.[62] It is also quite in harmony with it when Bacon, in his favourite theory of heat, quietly ranks the astrological 'heat' of a metal, a star, and so on, on a line with the physical heat.

It is indeed true that the alchemistico-theosophic theory of nature derived from the Kabbala had won so deep a hold in England, and especially among the aristocratic class, that Bacon in all these matters is laying down nothing original, but is simply moving among the ideas of his environment; and we may in fact assume that Bacon, in his boundless servility, adopted, merely out of complaisance to the court, many more of such views than he could answer for to himself. On the other hand, again, we may observe that the assumption of soul running through all, and even through inorganic nature, as it was taught particularly by Paracelsus, stands in a very peculiar correlation with Materialism. It is the opposite extreme, which not only comes into contact with Materialism, but, in fact, frequently proceeds from it, since in the last result the production of spirit must be attributed to matter as such, and therefore in infinitely numerous gradations. The fantastical and personifying ornamentation of this doctrine of the universal diffusion of soul in matter, such as we find it in Paracelsus, belongs to the pointless absurdities of the age, and from this Bacon managed to keep himself toler-

[62] Comp. the extracts collected by Schaller, Gesch. der Naturphilosophie, Leipzig, 1841, S. 77–80.

ably free. His 'spiritus' have no hands or feet, and yet it is remarkable what a colossal misapplication the 'Restorer of the natural sciences' could make of his spirits in the explanation of nature without being exposed by his more knowing contemporaries. But so is it with our history: we may take it up where we will, we shall find similar phenomena. As to the much-debated question of the relation of Materialism to morality, we may unhesitatingly assume that Bacon, if his character had been purer and firmer, would, by the peculiarity of his thinking, have undoubtedly been led to strictly Materialistic principles. We find not fearless consistency, but scientific halfness and hesitation here again, in connection with moral degeneracy.

As to Descartes, the progenitor of the opposite line of philosophical succession, who established the dualism between mind and material world, and took the famous 'Cogito ergo sum' as his starting-point, it might at first appear that, as opposed to the Materialistic philosophy, he only reacted upon it in point of its consequence and clearness. But how then shall we explain the fact that the worst of the French Materialists, De la Mettrie, wished to be a thoroughgoing Cartesian, and not without having good reasons for so wishing? Here again, then, we find a more direct connection, which we will now proceed to explain.

With regard to the principles of investigation, Bacon and Descartes occupy primarily a negative attitude against all previous philosophy, and especially against the Aristotelian. Both begin by doubting of everything; but Bacon, in order that he may then be led to the discovery of truth by the hand of external experience; Descartes, to elaborate it by deductive reasoning out of that self-consciousness which was all that had remained to him amidst his doubts.

Here there can be no doubt that Materialism lies only upon Bacon's side, that the Cartesian system, if consis-

tently carried out from his fundamental principles, must have led to an Idealism in which the whole external world appears as mere phenomenon and only the ego has any real existence.[63] Materialism is empirical, and rarely employs the deductive method, and then only when a sufficient stock of materials has been acquired inductively out of which we may then attain to new truths by a free use of the syllogism. Descartes began with abstraction and deduction, and that was not only not Materialistic, but also not practical: it necessarily led him to those obvious fallacies in which, among all great philosophers, perhaps, no one abounds so much as Descartes. But, for once, the deductive method came to the front, and in connection with it that purest form of all deduction, in which, too, as well as in philosophy, Descartes holds an honourable place—mathematics. Bacon could not endure mathematics; the pride of the mathematicians—or perhaps, more truly, their rigorousness—displeased him, and he required that this science should be only a handmaid, but should not demean herself as mistress of physics.

Thus then proceeded principally from Descartes that mathematical side of natural philosophy which applied to all the phenomena of nature the standard of number and of geometrical figure. It deserves attention that even in the beginning of the eighteenth century the Materialists —before this name had become general—were not seldom described as 'mechanici,' that is, as people who started with a mechanical view of nature. This mechanical view of nature had really, however, been originated by Descartes, and had been developed by Spinoza, and not less Leibniz, although the last-named philosopher was very far from numbering himself amongst the adherents of this movement.

[63] In the Memoires pour l'Histoire des Sciences et des Beaux Arts, Trevoux et Paris, 1713, p. 922, a certain 'Malebranchist' living in Paris is referred to, although without mention of his name, who holds the most probable view to be, that he himself is the only existing being.

Although, then, in the most essential points, Materialism starts from Bacon, it was nevertheless Descartes who finally impressed upon this whole way of thinking that stamp of *mechanism* which appeared most strikingly in De la Mettrie's "L'Homme Machine." It was really due to Descartes that all the functions as well of intellectual as of physical life were finally regarded as the products of mechanical changes.

To the possibility of a natural science at all, Descartes had helped himself by the somewhat hasty conclusion, that although otherwise we must indeed have doubted the reality of things outside us, we may nevertheless conclude that they are really existing, because otherwise God must be a deceiver in having given us the idea of the external world.

This *salto mortale* accordingly lands Descartes at once in the midst of nature, in a sphere where he laboured with much greater success than in metaphysics. As to the general basis of his theory of external nature, Descartes was not an adherent of rigorous Atomism: he denied the conceivableness of the atoms. Even if there are smallest particles which cannot possibly be any further divided, yet God must be able to divide them again, for their divisibility is still constantly conceivable. But in spite of this denial of atoms, he was yet very far from striking into the path of Aristotelianism. His doctrine of the absolute fulness of space has not only an entirely different basis in the notion of matter, but it must even in the physical theory take a shape which is nearly allied to Atomism. There he substitutes for the atoms small round corpuscles, which remain in fact quite as unchanged as the atoms, and are only divisible in thought, that is, potentially; in place of the empty space which the ancient Atomists adopted, he had extremely fine splinters, which have been formed in the interstices when the corpuscles were originally rounded. By the side of this view we may seriously ask whether the metaphysical theory of the absolute ful-

ness of space is not a mere makeshift, in order, on the one hand, not to swerve too far from the orthodox idea, and yet, on the other hand, to have all the advantages for a picturable explanation of natural phenomena which are possessed by Atomism? Descartes, moreover, expressly explained the movement of the particles as well as those of bodies out of mere conduction, according to the laws of mechanical impact. He named, indeed, the universal cause of all movement, God; but all bodies, according to him, are subject to a particular motion, and every natural phenomenon consists, without distinction of the organic or inorganic, merely of the conduction of the motion of one body to another; and thus all mystical explanations of nature were set aside at once, and that by the same kind of principle which was followed by the Atomists also.

In reference to the human soul, the point around which all controversies turned in the eighteenth century, Bacon was at bottom again a Materialist. He assumed, it is true, the *anima rationalis*, but only on religious grounds; intelligible he did not consider it. But the *anima sensitiva*, which alone he thought capable of a scientific treatment, Bacon regarded in the sense of the ancients as a fine kind of matter. Bacon, in fact, did not at all recognise the conceivableness of an immaterial substance, and his whole mode of thought was inconsistent with the view of the soul as the *form* of the body in the Aristotelian sense.

Although this was just the point on which Descartes seemed to stand most sharply opposed to Materialism, it is nevertheless in this very sphere that the Materialists borrowed from him the principles leading to the most important consequences.

Descartes, in his corpuscular theory, made no essential distinction between organic and inorganic nature. Plants were machines; and as to animals, he suggested, even though it was only under the form of an hypothesis, that he regarded them also as in fact mere machines.

Now the age of Descartes happened to occupy itself

very busily with animal psychology. In France especially one of the best-read and most influential of authors, the ingenious sceptic Montaigne,[64] had rendered popular the paradoxical proposition that the animals display as much, and often more, reason than men. But what Montaigne had playfully suggested, in the shape of an apology for Raymund of Sabunde, was made by Hieronymus Rorarius the subject of a special treatise, published by Gabriel Naudäus in 1648, and bearing the title, "Quod animalia bruta saepe ratione utantur melius homine."[65]

This proposition appeared to be a direct contradiction to that of Descartes, but there was, nevertheless, a synthesis of the two found possible in this position—that the animals are machines, and yet think. The step from the animal to man was then but a short one; and, moreover, here also Descartes had so prepared the way, that he may fairly be regarded as the immediate forerunner of outspoken Materialism. In his treatise "Passiones Animae," he calls attention to the important fact that the dead body is not only dead because the soul is wanting to it, but because the bodily machine itself is partially destroyed.[66] If we reflect that the entire sum of the idea of the soul possessed by primitive peoples is due to the comparison

[64] Montaigne is at the same time one of the most dangerous opponents of Scholasticism and the founder of French scepticism. The leading Frenchmen of the seventeenth century were almost all under his influence, friend and foe alike; nay, we find that he exercised an important influence even upon the opponents of his gay and somewhat frivolous philosophy, as, for instance, upon Pascal and the men of Port Royal.

[65] The work of Hieronymus Rorarius waited a full hundred years for its publication, and it is therefore in its origin *earlier* than the "Essais" of Montaigne. It is distinguished by a grim and serious tone, and the assiduous emphasising of just such traits of animals as are most generally denied to them as being products of the 'higher faculties of the soul.' With their virtues the vices of men are set in sharp contrast. We can therefore understand that the manuscript, although written by a priest who was a friend both of Pope and Emperor, had to wait so long for publication.

The publisher, Naudäus, was a friend of Gassendi's, who also, unlike Descartes, has a very high estimate of the capacities of the animals.

[66] Passiones Animae, Art. v.: "Erroneum esse credere animam dare motum et calorem corpori;" and Art. vi.: "Quaenam differentia sit inter corpus vivens et cadaver."

of the living and the dead body, and that the ignorance of the physiological phenomena in the dying body is one of the strongest supports of the theory of a 'visionary soul' —that is, of that *more subtle man* who is supposed by the popular psychology to be present as the motive force in the inside of the man—we shall immediately recognise in this single point an important contribution to the carrying out of anthropological Materialism. And not less important is the unambiguous recognition of Harvey's great discovery of the circulation of the blood.[67] With this the whole Aristotelo-Galenian physiology fell to the ground; and although Descartes still held to the 'vital spirits,' they are at least in him entirely free from that mystical antithesis between matter and spirit, and from the incomprehensible relations of 'sympathy' and 'antipathy' to half-sensible half-supersensible 'spirits' of all kinds. With Descartes the vital spirits are genuine, materially-conceived matter, more logically imagined than Epikuros's soul-atoms, with their added element of caprice. They move themselves, and effect movement, just as in Demokritos, exclusively according to mathematical and physical laws. A mechanism of pressure and collision, which Descartes follows out with great ingenuity through all the separate steps, forms an uninterrupted chain of effects produced by external things through the senses upon the brain, and from the brain back again outwards through nerves and muscular filaments.

In this state of things we may seriously ask whether De la Mettrie was not in truth quite justified when he traced his own Materialism to Descartes, and maintained that the wily philosopher, purely for the sake of the parsons, had patched on to his theory a soul, which was in reality quite superfluous. If we do not go quite so far as this, it is chiefly the unmistakable importance of the

[67] On the universal denial with which Harvey's great discovery was met, and the importance of Descartes's agreement, comp. also Buckle, "History of Civilisation in England," ii. 80, ed. 1871.

idealistic side of Descartes's philosophy that keeps us from doing so. Doubtful as is the way in which he deduces the 'Cogito ergo sum,' and crying as are the logical tricks and contradictions by means of which the otherwise clear-thinking man seeks to construct the world from inside, yet the thought that the whole sum of phenomena must be conceived as the *representation* of an immaterial subject possesses an importance which cannot have escaped its own originator. What Descartes lacks is at bottom exactly what Kant achieved—the establishing of a tenable connection between a *materially*-conceived nature and an idealistic metaphysic, which regards this whole nature as a mere sum of phenomena in an ego which is as to its substance unknown to us. It is, however, psychologically quite possible that Descartes conceived the two sides of knowledge which appear harmoniously combined in Kantianism each by itself quite clearly, however they may seem, taken thus separately, to contradict each other; and that he clung to them the more obstinately as he saw himself compelled to hold them together by an artificial cement of hazardous propositions.

For the rest, Descartes himself did not originally consider very important the whole metaphysical theory with which his name is now chiefly connected, while he attributed the greatest value to his scientific and mathematical inquiries, and to his mechanical theory of all natural phenomena.[68] When, however, his new proofs fer the im-

[68] This appears clearly enough from a passage in his Essay on Method, vol. i. p. 191 foll. of the edition of Victor Cousin, Paris, 1824: ". . . bien que mes speculations me plussent fort, j'ai cru que les autres en avoient aussi qui leur plaisoient peut-être davantage. Mais, sitôt que j'ai eu acquis *quelques notions générales touchant la physique*, et que commençant à les éprouver en diverses difficultés particulières, j'ai remarqué jusques où elles peuvent conduire, et combien elles diffèrent des principes dont on s'est servi jusques à présent, j'ai cru que je ne pouvois les tenir cachées sans pecher grandement contre la loi qui nous oblige à procurer autant qu'il est en nous le bien general de tous les hommes; car elles m'ont fait voir qu'il est possible de parvenir à des connoissances qui soient fort utiles à la vie; et qu'au lieu de cette philosophie speculative qu'on enseigne dans les écoles, on en peut trouver une pratique, par laquelle,

materiality of the soul and for the existence of God met with great approbation in an age disquieted by scepticism, Descartes was glad enough to pass for a great metaphysician, and paid increasing attention to this portion of his doctrine. Whether his original system of the Kosmos may have stood somewhat nearer to Materialism than his later theory, we cannot say; for it is well known that out of fear of the clergy he called back his already completely finished work, and subjected it to a thorough revision. Certain it is that he, against his better convictions, withdrew from it his theory of the revolution of the earth.[69]

connoisant la force et les actions du feu, de l'eau, de l'air, des astres, des cieux, et de tous les autres corps qui nous environnent, aussi distinctement que nous connoissons les divers métiers de nos artisans," etc. Compare Note 17 to the following section.

[69] As to Descartes's personal character, very different opinions have made themselves heard. The point in dispute is whether his ambition to be considered a great discoverer, and his jealousy of other prominent mathematicians and physicists, did not sometimes carry him beyond the limits of what is honourable. Comp. Whewell, History of the Inductive Sciences, ii. 379, where he is said to have used without acknowledgment Snell's discovery of the law of refraction; and the severe remarks, on the other side, of Buckle, Hist. Civ. in Engl., ii. 77 foll., who, however, in several respects rates Descartes too high. With this may be compared his controversy with the great mathematician Fermat; his perverse and disparaging judgments as to Galilei's doctrine of motion; his attempt to appropriate, on the strength of a remarkable but by no means sufficiently clear expression, the authorship of Pascal's great discovery of the rarification of the atmosphere upon mountains, and so on. As to all these things, the last word appears to us not yet to have been spoken; and as to his denial of his own view from fear of the clergy, that rests upon quite a different footing. When, however, Buckle, after Lerminier (comp. Hist. of Civ. in Engl., ii. 82), compares Descartes with Luther, we must remind ourselves of the great contrast between the reckless boldness of the German reformer and the cautious evasion of the enemy which Descartes introduced into the struggle between free-thinking and suppression. That Descartes modelled his system, against his better knowledge, after the doctrine of the Church, and apparently as far as possible after Aristotle, is a fact of which there can be no doubt in view of the following passages from his correspondence:—

To Mersenne, July 1633 (Œuvres, ed. Cousin, vi. 239): Descartes has heard with surprise of the condemnation of a book of Galilei's; conjectures that this is because of his theory of the earth's movement, and confesses that the same objection will apply to his own work:—"Et il est tellement lié avec toutes les parties de mon Traité que je ne l'en saurois détacher, sans rendre le reste tout défectueux. Mais comme je ne voudrois pour rien du monde qu'il sortît de moi un discours ou il se trouvât le moindre mot qui fût dés-

approuvé de l'église, aussi aimé-je mieux le supprimer que de le faire paroître estropié." To the same, January 10, 1634 (vi. 242 foll.): "Vous savez sans doute que Galilée a été repris depuis peu par les inquisiteurs de la foi, et que son opinion touchant le mouvement de la terre a été condamné comme hérétique; or je vous dirai, que toutes les choses, que j'expliquois en mon traité, entre lesquelles étoit aussi cette opinion du mouvement de la terre, dépendoient tellement les unes des autres, que c'est assez de savoir qu'il en ait une qui soit fausse pour connoître que toutes les raisons dout je me servais n'ont point de force; et quoique je pensasse qu'elles fussent appuyées sur des démonstrations très certaines et très évidentes, je ne voudrois toutefois pour rien du monde les soutenir contre l'autorité de l'église. Je sais bien qu'on pourroit dire que tout ce que les inquisiteurs de Rome ont décidé n'est pas incontinent article de foi pour cela, et qu'il faut premièrement que le concile y ait passé; mais je ne suis point si amoureux de mes pensées que de me vouloir servir de telles exceptions, pour avoir moyen de les maintenir; et le désir que j'ai de vivre au repos et de continuer la vie que j'ai commencée en prenant pour ma devise 'bene vixit qui bene latuit,' fait que je suis plus aise d'être délivré de la crainte que j'avois d'acquérir plus de connoissances que je ne désire, par le moyen de mon écrit, que je ne suis fâché d'avoir perdu le temps et la peine que j'ai employée à le composer." Towards the end of the same letter he says, on the contrary (p. 246): "Je ne perds pas tout-à-fait espérance qu'il n'en arrive ainsi que des antipodes, qui avoient été quasi en même sorte condamnés autrefois, et ainsi que mon Monde ne puisse voir le jour avec le temps, auquel cas j'aurois besoin moi-même de me servir de mes raisons." This latter expression especially is as clear as can be desired. Descartes could not make up his mind to dare to use his own understanding, and so he determined to propound a new theory, which enabled him to secure his object of avoiding an open conflict with the Church.

THIRD SECTION.

SEVENTEENTH CENTURY MATERIALISM.

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CHAPTER I.

GASSENDI.

WHEN we attribute to Gassendi in particular the revival of an elaborate Materialistic philosophy, the position we assign him needs some words of vindication. We lay especial stress upon this, that Gassendi drew again into the light, and adapted to the circumstances of the time, the fullest of the Materialistic systems of antiquity, that of Epikuros. But this it is upon which those have relied who reject Gassendi from the period of an independent philosophy which was inaugurated by Bacon and Descartes, and regard him as a mere continuer of the obsolete period of the reproduction of old classical systems.[1]

[1] Gassendi is indeed, as was scarcely made sufficiently clear in the first edition of the History of Materialism, a *forerunner* of Descartes, and independent of Bacon of Verulam. Descartes, who was usually not over prone to the recognition of others, regards Gassendi as an authority in scientific matters (comp. the following places in his letters: Oeuvres, ed. Cousin, vi. 72, 83, 97, 121); and we may with the utmost probability assume that he was also acquainted with the "Exercitationes Paradoxicae," 1624, and even that he knew more of the contents of the five burnt books from oral communication than has been preserved to us in the table of contents. Later, of course, when Descartes, through fear of the Church, invented a world which rested upon essentially different principles from those of Gassendi, he changed his tone also in reference to Gassendi; especially as he had become a great man through his attempt to find a compromise between science and ecclesiastical doctrine.

And upon a stricter examination of the relations between Gas-

This, however, is to overlook the essential difference that existed between the Epikurean and every other ancient system in relation to the times in which Gassendi lived. Whilst the prevailing Aristotelian philosophy, displeasing as it was to the fathers of the Church, had in the course of the middle ages almost fused itself with Christianity, Epikuros remained the emblem of utmost heathenism, and also of absolute contradiction to Aristotle. If we add to this the impermeable masses of traditional calumnies with which Epikuros was overwhelmed, the groundlessness of which a discerning scholar here and there had pointed out, without, however, striking a decisive blow, the rehabilitation of Epikuros, together with the revival of his philosophy, must appear a fact which, regarded merely in its negative aspect as the completed opposition to Aristotle, may be placed by the side of the most independent enterprises of that time. Nor does this consideration exhaust the full significance of Gassendi's achievement.

It was not by accident, nor out of mere love of opposition, that Gassendi lighted upon Epikuros and his philosophy. He was a student of nature, a physicist indeed, and an empiric. Bacon had already held up Demokritos, and not Aristotle, as the greatest of the ancient philosophers. Gassendi, whose thorough philological and historical training equipped him with a knowledge of all the

sendi and Descartes, the right of the former to be considered the first representative of a theory of the world which has lasted down to our own days only becomes more clear, for Descartes also, the more narrowly we regard him, enters into a more distinct relation to the extension and propagation of Materialistic modes of thought. Voltaire, indeed, said in his "Elements of the Newtonian Philosophy" (Oeuvres compl., 1784, t. xxxi. c. i.), that he had known many who had been led on by Cartesianism to the denial of God! It is incomprehensible how Schaller, in his Gesch. d. Naturphil., Leipzig, 1841, could set Hobbes before Gassendi. It is true enough that in point of years the former is the older, but then he was as unusually late in his development as Gassendi was unusually early, and during their intercourse in Paris, Hobbes was distinctly the learner, to say nothing of Gassendi's literary productions published so long before.

systems of antiquity, embraced with a sure glance exactly what was best suited to modern times, and to the empirical tendency of his age. Atomism, by *his* means drawn again from antiquity, attained a lasting importance, however much it was gradually modified as it passed through the hands of later inquirers.[2]

It might, indeed, appear hazardous to make the Provost of Digne, the orthodox Catholic priest Gassendi, the propagator of modern Materialism; but Materialism and Atheism are not identical, even if they are related conceptions. Epikuros himself sacrificed to the gods. The men of science of this time had acquired through long practice a wonderful skill in keeping upon a formal footing of friendliness with theology. Descartes, for example, introduced his theory of the development of the world from small particles with the observation, that of course God had created the world at one time, but that it was very interesting to see how the world might have developed itself, although we know that it had really not done so. But

[2] Naumann, in his Grundr. d. Thermochemie, Braunschweig, 1869, a work of great scientific merit, observes unjustly, S. 11: "The chemical theory of atoms has, however, nothing, or next to nothing, in common with the atomistic doctrine previously propounded by Lucretius and Demokritos." The historical continuity, which we shall prove in the sequel, indicates a community right from the beginning of the development, in spite of all the differences to be found in the final product. Both views, moreover, have this also in common—which Fechner points out as the most important feature of Atomism—that they both suppose *discrete* molecules; and although this may not perhaps be so all-important to the chemist as it is to the physicist, still it remains an essential point: and yet the more essential one is concerned, as is Naumann, to explain chemical phenomena out of physical changes. It is also not correct to say (*loc. cit.*, S. 10, 11) that before Dalton none had tested the correctness and applicability of Atomism by reference to the facts. This had been done immediately after Gassendi, by Boyle for chemistry, and by Newton for physics; and although it may not have been done as the science of today would have it done, yet we must not forget that even Dalton's theory is now a discarded standpoint. Naumann is quite right in saying (with Fechner, Atomlehre, 1855, S. 3), that in order to controvert modern Atomism, it is necessary first to know what it is. But we may also remark, that in order to controvert the connection of ancient with modern Atomism, it is necessary first to know the *historical* no less than 'the scientific' facts.

when he is once launched upon the scientific theory, then this development hypothesis alone is visible; it best harmonises with all the facts, and fails in no single point. And thus the divine creation becomes a meaningless formula of acknowledgment. So fares it likewise with motion, in which God is the prime cause—which, however, troubles the inquirer no further. The principle of the maintenance of force through constant transmission of mechanical impact, with its very untheological contents, yet receives a theological form. In the same way, then, the Provost Gassendi goes to work. Mersenne, another theologian, given to the study of science, and at the same time a good Hebraist, had published a Commentary on Genesis, in which all the objections of Atheists and Naturalists were answered, but in such fashion that many shook their heads; and at least the greatest industry was applied to the collection rather than the refutation of these objections. Mersenne occupied a middle position between Descartes and Gassendi, and was a friend of both men, as he was of the the English Hobbes. This last was a decided partisan of the King and of the Episcopal High Church, and is at the same time regarded as the head and father of the Atheists.

It is interesting, too, that Gassendi does not draw the theory of his ambiguous conduct from the Jesuits, as he well might have done; but bases it on the example of Epikuros. In his Life of Epikuros is a long discussion, the point of which lies in the principle, that mentally Epikuros might think as he would, but in his outward demeanour he was subject to the laws of his country. Hobbes stated the doctrine still more sharply: the state has unconditional power over worship; the individual must resign his judgment, but not mentally, for our thoughts are not subject to command, and therefore we cannot compel any one to believe.[3]

[3] De Vita et Moribus Epicuri, iv. 4: "Dico solum, si Epicurus quibusdam Religionis patriae interfuit caerimoniis, quas mente tamen improbaret,

But the rehabilitation of Epikuros, and the exposition of his doctrine, required great caution in Gassendi. We see clearly from the preface to his book on the life and morals of Epikuros, that it seemed a bolder thing to follow Epikuros than to set forth a new cosmogony.[4] Nevertheless the justification of his cause he wisely does not seek deeply, but puts together superficially, though with a great expenditure of dialectic skill—a proceeding which has always succeeded better with the Church than a serious and independent attempt to reconcile its doctrines with strange or hostile ingredients.

Is Epikuros a heathen?—so too was Aristotle. If Epikuros attacks superstition and religion, he was right, for he knew not the true religion. Does he teach that the gods neither reward nor punish, and does he honour them for their perfection?—we have only the thought of childish instead of servile reverence, and therefore a purer and more Christian conception. The errors of Epikuros must be carefully corrected; which is done, however, in that Cartesian

videri posse, illi quandam excusationis speciem obtendi. Intererat enim, quia jus civile et tranquillitas publica illud ex ipso exigebat: Improbabat, quia nihil cogit animum Sapientis, ut vulgaria sapiat. Intus, erat sui juris, extra legibus obstrictus societatis hominum. Ita per salvebat eodem tempore quod et aliis debebat, et sibi. . . . Pars haec tum erat Sapientiae, ut philosophi sentirent cum paucis, loquerèntur vero, agerentque cum multis." Here the last clause especially seems to be more applicable to Gassendi's time than to Epikuros, who enjoyed great liberty of teaching and speaking, and availed himself of it. Hobbes (Leviathan, c. xxxii.) maintains that obedience to the state religion involves also the duty of not contradicting its doctrines. This course, indeed, he followed according to the letter, but at the same time was restrained by no scruples from withdrawing the ground from under all religion—for those who are clever enough to draw conclusions. The "Leviathan" appeared in 1651; the first edition of the treatise "De Vita et Moribus Epicuri" in 1647; yet here no weight can be laid on the priority of the thought; it lay entirely in the time and in the general questions (where there was no reference to mathematics and natural science). Hobbes had undoubtedly been independent long before he came to know Gassendi.

[4] Observe the unusually solemn tone in which Gassendi, towards the conclusion of the preface to the "De Vita et Moribus Epicuri," reserves the doctrine of the Church: "In Religione Majores, hoc est Ecclesiam Catholicam, Apostolicam et Romanam sequor, cuius hactenus decreta defendi ac porro defendam, nec me ab illa ullius unquam docti aut indocti separabit oratio."

spirit which we have just observed in the doctrines of the creation and of motion. The frankest eagerness is shown to vindicate for Epikuros among all ancient philosophers the greatest purity of morals. In this way, then, are we justified in regarding Gassendi as the true regenerator of Materialism, and the more so when we consider how great was the actual influence he exercised upon succeeding generations.

Pierre Gassendi, the son of poor peasants, was born in 1592, near Digne in Provence. He became a student, and was at sixteen years of age a teacher of Rhetoric, and three years later Professor of Philosophy at Aix. He had already written a book which clearly shows his leanings—the "Exercitationes Paradoxicae adversus Aristoteleos," a work full of youthful zeal, one of the sharpest and most contemptuous attacks upon the Aristotelian philosophy. This was later, in the years 1624 and 1645, printed in part, but five books at the advice of his friends were burnt. Advanced by the learned senator Peirescius, Gassendi was soon afterwards made a canon and then provost at Digne.

This rapid career led him through various departments. As Professor of Rhetoric he had to give philological instruction, and it is not improbable that his preference for Epikuros grew up in this period from his study of Lucretius, who in philological circles had long been highly prized. When Gassendi in 1628 undertook a journey to the Netherlands, the philologist Eryceus Puteanus, of Louvain, gave him a copy of a gem with a portrait of Epikuros, which was very highly reverenced by himself.[5]

[5] De Vita et Moribus Epicuri, conclusion of the preface (To Luiller): "Habes ipse jam penes te duplicem illius effigiem, alteram ex gemma expressam, quam dum Lovanio facerem iter, communicavit mecum vir ille eximius Eryceus Puteanus, quamque etiam in suis epistolis cum hoc eulogie evulgavit: 'Intuere, mi amice, et in lineis istis spirantem adhuc mentem magni viri. Epicurus est; sic oculos, sic ora ferebat. Intuere imaginem dignam istis lineis, istis manibus, et porro oculis omnium.' Alteram expressam ex statua, Romae ad ingressum interioris Palatii Ludovisianorum hortorum exstante, quam ad me misit Naudaeus noster (the publisher of the essay of Hieronymus Rorarius mentioned in the previous section) usus opera Henrici Howenii in eadem familia Cardinalitia

The "Exercitationes Paradoxicae" must, in fact, have been a work of uncommon boldness and great acuteness, and we have every reason to suppose that it did not remain without influence upon the learned world of France, for the friends who advised the burning of the five lost books must have been acquainted with their contents. It is also intelligible that Gassendi would take counsel of men who were near his own standpoint, and were capable of understanding and appreciating the contents of his work from other aspects than the consideration of its dangerousness. So may in those times many a fire have quietly smouldered unsuspected, the flames of which were to break out later in quite other directions. Happily at least a brief statement of the contents of the lost books has been preserved to us. From this we see that in the fourth book not only the Copernican theory was advanced, but also the doctrine of the eternity of the world, which had been drawn from Lucretius by Giordano Bruno. As the same book contained an assault upon the Aristotelian elements, we may very easily conjecture that Atomism was here taught in opposition to Aristotle. This is the more probable because the seventh book, according to this table of contents, contained a formal recommendation of the Epikurean theory of Morals.[6]

Gassendi was, moreover, one of those happy natures who can everywhere allow themselves a little more than other people. The precocious development of his mind had not with him, as with Pascal, led to an early satiety of knowledge and a melancholy existence. Light-hearted and amiable, he everywhere won himself friends, and, with all the modesty of his demeanour, he allowed himself gladly,

pictoris. Tu huc inserito utram vales, quando et non male altera, ut vides, refert alteram, et memini utramque congruere cum alia in amplissimo cimeliarcho Viri nobilis Casparis Monconisii Lierguii, propraetoris Lugdunensis, asservata."

[6] Exercitationes Paradoxicae adversus Aristoteleos, Hagae Comitum, 1656, Praef.: "Uno verbo docet (b. vii.) Epicuri de voluptate sententiam: ostendendo videlicet, qua ratione summum bonum in voluptate constitutum sit, et quemadmodum laus virtutum actionumque humanarum ex hoc principio dependeat."

amongst those he could trust, to give the reins to his inexhaustible humour. In his anecdotes the traditional medicine came very badly off, and he has suffered bitterly enough from her retaliation. It is notable that amongst the authors who had influenced him in his early youth, and freed him from Aristotle, he mentions in the first line, not the witty scoffer Montaigne, but the pious sceptic Charron and the serious Luis Vives, who always unites a strong moral judgment with his logical acumen.

Like Descartes, so Gassendi, too, must renounce, in setting forth his philosophy, "the use of his own intellect," only it did not occur to him to push the process of accommodation to the doctrines of the Church further than was anywhere necessary. Whilst Descartes made a virtue of necessity, and veiled the Materialism of his natural philosophy in the broad mantle of an idealism dazzling by its novelty, Gassendi remained essentially a Materialist, and viewed the devices of him who had formerly shared his views with unconcealed dissatisfaction. In Descartes the mathematician has the upper hand; in him, the physicist: while the other, like Plato and Pythagoras in antiquity allowed himself to be seduced by the example of mathematics to overpass with his conclusions the field of all possible experience, *he* clung to empiricism, and except so far as ecclesiastical dogma seemed unconditionally to demand it, never forsook the borders of a speculation which ever framed its very boldest theories on the analogy of experience. Descartes sold himself to a system which violently severs thought and sensuous intuition, and by this very means makes its way to the most hazardous assertions; Gassendi maintained with unshaken steadfastness the unity of thought and sensuous intuition.

In the year 1643 he published his "Disquisitiones Anticartesianae," a work justly distinguished as a model of controversy, as delicate and polite as it is thorough and witty. If Descartes began by doubting of everything, even of what was given in sense, Gassendi showed that it

is plainly impossible to realise an abstraction from all that was given in sense—that therefore the 'Cogito ergo sum' was anything rather than the highest first truth from which all others were deduced.

In fact, that Cartesian doubt which is taken up some fine morning ("semel in vita") in order to free the soul from all the prejudices imbibed since childhood, is a mere frivolous playing with empty ideas. In a concrete psychical act thought can never be separated from sense elements; but in mere formulae (as, *e.g.*, we reckon with $\sqrt{-1}$, without being able to represent this magnitude to ourselves), we may amuse ourselves by rejecting in the same way the doubting subject, and even the act of doubt. We gain nothing by this, but we also lose nothing except—the time devoted to speculations of this kind.

Gassendi's most famous objection, that existence may just as well be inferred from any other action as from thinking,[7] is so obvious, indeed, that it has often been repeated independently of Gassendi, and as often shown to be superficial and unintelligible. Büchner declares that the argument is the same as if we were to say, "The dog barks, therefore he is." Buckle,[8] on the contrary, declares such criticism to be short-sighted, since it is not a logical but a psychological process that is in question.

But, as against this well-meant defence, we must bear in mind the fact, as clear as sunshine, that it is Descartes, in fact, who confuses the logical and psychological processes, and that when we clearly discriminate them the whole argument collapses.

To begin with, this *formal* correctness of the objection is quite indisputably established in the words of the "Principia" (i. 7), "Repugnat enim, ut putemus id quod cogitat, eo ipso tempore, quo cogitat, nihil esse." Here the purely logical argument of Descartes is employed to

[7] The example, 'I walk, therefore I am,' originates not with Gassendi, but with Descartes, who uses it in his rejoinder,—in other respects quite agreeing with this objection.

[8] Buckle, Hist. of Civilis, ii. 87 n.

challenge Gassendi's second objection. But if it is proposed to substitute the psychological method, then the second of Gassendi's objections asserts itself: This psychological process does not, and can not exist; it is a pure fiction.

The justification adopted by Descartes himself appears to go furthest, which relies upon the logical deduction, and makes the distinction that in one case the premiss 'I think' is certain, whilst, on the other hand, in 'I go to walk, and therefore I am,' the premiss upon which it rests is doubtful, and therefore the conclusion is impossible. But this also is idle sophistry; for if I really go to walk, I can assuredly consider my walking as the mere phenomenal side of an act entirely different in itself, and I can do the same in precisely the same way with my thinking as a psychological phenomenon; I cannot, however, without absolute untruth, annul the *idea* that I go to walk, any more than I can the idea of my thinking, especially if in *cogitare* one includes, with Cartesius, also *velle*, *imaginare*, and even *sentire*.

And, least of all, can the inference to a subject of thinking be justified, as Lichtenberg has shown in the excellent remark: "Shall we say 'it thinks' as we say 'it lightens': to say 'cogito' is too much if we are to translate it 'I think.'" It is practically necessary to assume, to postulate the *I*.[9]

[9] The credit for the priority of this remark appears to be due to Kant, who says in the Krit. d. r. Vern. Elementarl., ii. 2, 2, 1 Hauptst. (Paralogismen d. r. Vern.), E. T., p. 239: "By this I, or He, or It which thinks, nothing more is represented than a transcendental subject of thought = *x*, which is cognised only by means of the thoughts that are its predicates, and of which, apart from these, we cannot form the least conception." At the same time, this does not detract from the great merits of Lichtenberg's statement of the question, which, in the simplest way, demonstrates so clearly the surreptitious nature of the Subject.

We may mention, by the way, that the attempt to prove the existence of the soul from the very fact of *doubt*, in very striking agreement with the 'Cogito ergo sum,' was first introduced by the Father Augustine, who thus argues in the 10th Book 'De Trinitate:' "Si quis dubitat, vivit si dubitat, unde dubitet meminit; si dubitat, dubitare se intelligit." This passage is quoted in the once widely spread "Margarita Philoso-

In 1646, Gassendi became Regius Professor of Mathematics at Paris, where his lecture-room was crowded by listeners of all ages, including well-known men of letters. He had only with difficulty resolved to quit his Southern home, and being soon attacked by a lung complaint, he returned to Digne, where he remained till 1653. In this period falls the greater part of his literary activity and zeal in behalf of the philosophy of Epikuros, and simultaneously the positive extension of his own doctrines. In the same period Gassendi produced, besides several astronomical works, a series of valuable biographies, of which those of Copernicus and of Tycho Brahe are especially noteworthy. Gassendi is, of all the most prominent representatives of Materialism, the only one gifted with a historic sense, and that he has in an eminent degree. Even in his "Syntagma Philosophicum," he treats every subject at first historically, from all possible points of view.

Of cosmical systems, he declares the Ptolemaic, the Copernican, and the Tychonic to be the most important. Of these, he entirely rejects the Ptolemaic, declares the Copernican to be the simplest and the one most thoroughly representing the facts; but one must adopt that of Tycho, because the Bible obviously attributes motion to the sun. It affords us an insight into the time, that the once so cautious Gassendi, who on all other points kept peace between his Materialism and the Church, could not even reject the Copernican system without drawing upon himself, by his laudatory expressions, the reproach of a heretical view of cosmology. Yet the hatred of the supporters of the old

phica" (1486, 1503 and often) at the beginning of the 10th book, "De Anima." Descartes, who had his attention called to its agreement with his principle, seems not to have known it; he admits that Augustine had, in fact, proposed to prove the certainty of our existence in this way; he himself, however, had used this argument in order to show that that ego which thinks is *an immaterial substance*. Descartes therefore quite rightly emphasises as his special property precisely that element which is most obviously surreptitious. Comp. Oeuvres, t. viii., ed. Cousin, p. 421.

cosmology becomes in some measure intelligible when we see how Gassendi contrived to undermine its foundations without open assault. A favourite argument of the opponents of Copernicus was, that if the earth revolved, it would be impossible for a cannon-ball fired straight up into the air to fall back upon the cannon. Gassendi thereupon, as he relates himself, had an experiment made:[10] on a ship travelling at great speed a stone was thrown straight up into the air. It fell back, following the motion of the ship, upon the same part of the deck from which it had been thrown. A stone was dropped from the top of the mast, and it fell exactly at its foot. These experiments, to us so ordinary, were then, when men were only beginning, by the aid of Galilei, to understand the laws of motion, of great significance, and the main argument of those who denied the motion of the earth was by their assistance hopelessly overthrown.

The world Gassendi regarded as one ordered whole, and the only question is as to the nature of the order, especially if the world possesses a soul or not. If by the world-soul one means God, and it is only meant that God by his being and presence maintains, governs, and so in a sense constitutes the soul of all things, this may always be possible.

All are agreed also that heat is diffused throughout the universe; *this heat might also be called the soul of the world;* and yet to attribute to the world, in the strict sense, a vegetative feeling or thinking soul contradicts the reality of things. For the world neither produces another world, as the plants and animals, nor grows or nourishes itself by food and drink; still less has it sight, hearing, and other functions of things possessing souls.

Place and time are viewed by Gassendi as existing quite independently, neither substance nor accident. At the

[10] In the treatise "De Motu Impresso a Motore Translato," which, as it was pretended, was printed against the author's wish, together with a letter of Galilei's on the reconciliation of the Holy Scriptures with the doctrine of the earth's revolution, at Lyons, 1649.

point where all corporeal things cease space still extends without limit, and time sped before the creation of the world as regularly as now. By the material principle or *materia prima* is meant that matter which cannot be further dissolved. So man is composed of head, heart, belly, and so on. These are formed out of chyle and blood; these again from food, and food from the so-called elements; but these also are again composed of atoms, which are therefore the material principle or *materia prima*. Matter is consequently in itself as yet without form. But there is also no form without a material body, and this is the durable substratum, while forms change themselves and go. Matter is therefore itself indestructible, and it is incapable of being produced, and no body can arise out of nothing, although this does not go to deny the creation of matter by God. The atoms are in point of substance identical, but vary in figure.

The further exposition of atoms, void, the denial of infinite divisibility, the motion of the atoms, and so on, closely follows Epikuros. We need only remark, that Gassendi identifies the weight or gravity of the atoms with their inherent capability of self-determined motion. For the rest, this motion also has been from the beginning bestowed by God upon the atoms.

God, who made the earth and sea bring forth plants and animals, created a finite number of atoms, so as to form the seeds of all things. Thereupon commenced that alternation of generation and dissolution which exists now, and will continue to exist.

'The first cause of everything is God,' but the whole inquiry is concerned only with the secondary causes, which immediately produce each single change. Their principle, however, must necessarily be corporeal. In artistic productions, the moving principle is indeed independent of the material; but in nature the active cause works inwardly, and is only the most active and mobile part of the material. In the case of visible bodies, one is always

moved by the other: the self-moving principles are the atoms.

The falling of bodies Gassendi explains to be due to the attraction of the earth; but this attraction cannot be an 'actio in distans.' If no influence from the earth reached the stone and overpowered it, it would not trouble itself about the earth; just as the magnet must in some real if invisible manner lay hold upon the iron in order to draw it to itself. That this is not to be conceived crudely, as done by the throwing out of harpoons or hooks, is shown by a remarkable picture employed by Gassendi to explain this attraction, of a boy attracted by an apple, a figure of which has reached him through the senses.[11] It is worth

[11] With regard to this, it seems to me very doubtful whether the account in Ueberweg, Hist. Phil., iii. 15 foll., E. T. ii. 14, is correct—an account resting perhaps partly on a misunderstanding of the account in the first edition of the "History of Materialism," but partly also on an actual error in that account. Ueberweg says of Gassendi: "Gassendi's Atomism is less a doctrine of dead nature than is that of Epikuros. Gassendi ascribed to the atoms force, and even sensation, just as a boy is moved by the image of an apple to turn aside from his way and approach the apple-tree. So the stone thrown into the air is moved by the influence of the earth, reaching to it to pass out of the direct line and to approach the earth." Erroneous above all appears to have been the transference of sensation to the atoms, as was assumed in the first edition of the "History of Materialism," S. 125, while, upon revision, I am not in a position to find a voucher for this. The error seems to have arisen in this way—that Gassendi, in fact, with regard to the difficult question how the *sentient* can proceed from the *non-sentient*, does in a very remarkable respect go far beyond Lucretius. I am indeed sorry that I can here only quote Bernier, Abrégé de la Philos. de Gassendi, vi. 48 foll., as while revising I have no complete edition of Gassendi at my service, and the press cannot be longer delayed. There it runs: "En second lieu (among the reasons which Lucretius has not adduced, but, according to Gassendi, might have adduced) que toute sorte de semence estant animée, et que non seulement les animaux qui naissent de l'accouplement, mais ceux mesme qui s'engendrent de la pourriture estant formez de petites molecules seminales qui ont esté assemblées et formées ou dès le commencement du monde ou depuis, *on ne peut pas absolument dire, que les choses sensibles se fassent de choses insensibles*, mais plutôst qu'elles se font de choses qui bien qu'elles ne sentent pas effectivement, sont neanmoins, *ou contiennent en effet les principes du sentiment*, de mesme que les principes du feu sont contenus, et caches dans les veines des cailloux, ou dans quelque autre matière grasse." Gassendi therefore assumes here at least the possibility that organic germs, with the disposition towards sensation, exist right from the beginning of creation. These germs, however, despite their originality (naturally quite inconsistent with the cosmogony of Epikuros) are not atoms, but *combinations of*

remarking here that Newton, who in this matter trod in Gassendi's steps, by no means thought of his law of gravitation as an immediate operation exerted at a distance.[12]

The evolution and dissolution of things is nothing but the union and separation of atoms. When a piece of wood is burnt, the flame, smell, and ashes, and so on, have already existed in their atoms, only in other combinations. All change is only movement in the constituents of a thing, and hence the simple substance cannot change, but only continue its movements in space.

The weak side of Atomism, the impossibility of explaining sensible qualities and sensation out of atoms and space (*cf.* above, p. 18 foll., and 143 foll.), appears to have been quite appreciated by Gassendi, for he discusses this problem at great length, and not only endeavours to put the explanations offered by Lucretius in the best light, but also to strengthen them by new experiments. At the same time he admits that there is something left unexplained—only he maintains that this is the same with all other systems.[13] This is, however, not quite correct, since the form of the combination, upon which the influence here depends, is with the Aristotelians something essential; but in the case of Atomism it is nothing.

Gassendi stands widely apart from Lucretius in accepting an immortal and incorporeal spirit; and yet this spirit,

atoms, although of the simplest character. A misunderstanding is possible as to the application of the image of the boy who sees an apple to a purely spiritual influence. This refers primarily only to a complex process of attraction, which, however, takes place in a purely physical way. It remains, indeed, questionable whether Gassendi has here carried out Materialism as consistently as Descartes in the "Passiones Animae," where everything is resolved into flow and impact of particles.

[12] Voltaire reports in his Elements of the Philosophy of Newton (Oeuvres compl., 1784, t. xxxi. p. 37): "Newton suivait les anciennes opinions de Démocrite, d'Epicure et d'une foule de philosophes rectifiées par notre célèbre Gassendi. Newton a dit plusieurs fois à quelques françois qui vivent encore, qu'il regardait Gassendi comme un esprit très juste et très sage, et qu'il ferait gloire d'être entièrement de son avis dans toutes les choses dont on vient de parler."

[13] Bernier, Abrégé de la Phil. de Gassendi, Lyon, 1684, vi. 32–34.

like Gassendi's God, stands so entirely out of relation to his system, that we can very conveniently leave it out of sight. Nor is Gassendi led to adopt it for the sake of this question of unity; he does so because religion demands it. Just because his system only recognises a material soul composed of atoms, the qualities of immortality and immateriality must be supplied by the spirit. The manner in which this is established strikingly reminds us of Averroism. Diseases of the mind, for example, are diseases of the brain; they do not affect the immortal reason, only this cannot find expression because its instrument is destroyed. But whether it is in this instrument that the individual consciousness, the ego, is seated, which is, in fact, itself disturbed by the disease, and does not look upon it as a spectator *ab extra*—this point Gassendi takes good care not to examine too closely. Besides, quite apart from the constraint of orthodoxy, he might well feel little inclination to follow the windings of this problem, because they would lead him away from the sphere of experience.

The theory of the external world, so admirably supported by Atomism, Gassendi had very much more at heart than psychology, in which he made shift with a minimum amount of original speculation, and that only for the completion of his system, while Descartes, independently of his metaphysical doctrine of the ego, attempted in this sphere also to make an independent contribution.

At the University of Paris, where the Aristotelian philosophy still held sway over the older teachers, the views of Descartes and of Gassendi gained increasing hold on the younger blood, and there arose two new schools—those of the Cartesians and the Gassendists, one of which in the name of reason, the other in the name of experience, were eager to inflict a final blow upon Scholasticism. This conflict was the more remarkable because just at that time, under the influence of reactionary tendencies, the

philosophy of Aristotle had received a fresh impulse. The theologian Launoy, otherwise a thoroughly learned and comparatively a freethinking man, exclaims in astonishment, as he mentions the views of his contemporary, Gassendi, "If Ramus, Litaudus, Villonius, and Clavius had so taught, what would have been done to them!"[14]

Gassendi did not fall a victim to theology, because he was destined to fall a victim to medicine. Being treated for a fever in the fashion of the time, he had been reduced to extreme debility. He long, but vainly, sought restoration in his Southern home. On returning to Paris, he was again attacked by fever, and thirteen fresh blood-lettings ended his life. He died the 24th of October 1655, in his sixty-third year. The reformation of physics and natural philosophy, usually ascribed to Descartes, was at least as much the work of Gassendi. Frequently, in consequence of the fame which Descartes owed to his metaphysic, those very things have been credited to Descartes which ought properly to be assigned to Gassendi: it was also a result of the peculiar mixture of difference and agreement, of hostility and alliance, between the two systems, that the influences resulting from them became completely interfused. Thus Hobbes, the Materialist and friend of Gassendi, was a supporter of Descartes's corpuscular theory, whilst Newton conceived the atoms after the fashion of Gassendi. It was reserved for later discoveries to reconcile the two theories, and to permit of the co-existence of atoms and molecules, after each conception had received its natural development. So much, however, is at least certain, that the Atomism of our own day has, step by step, been developed from the theories of Gassendi and Descartes, and so its roots reach back to Leukippos and Demokritos.

[14] Joannis Launoii de Varia Aristotelis in Academia Parisiensi Fortuna, c. xviii. p. 328 of the edition I have used. that of Wittenberg, 1720.

CHAPTER II.

THOMAS HOBBES OF MALMESBURY.

AMONGST the most remarkable characters that meet us in the history of Materialism must unquestionably be numbered the Englishman, Thomas Hobbes of Malmesbury. His father was a simple country clergyman of modest education, but possessed of sufficient ability to read the necessary homilies to his flock.

When, in the year 1588, the haughty Armada of Philip of Spain was threatening the English coasts, and the people were in a state of anxiety and excitement, the wife of this clergyman, in her alarm, gave premature birth to a boy, who, in spite of his delicacy as an infant, was destined to live to his ninety-second year. This babe was Thomas Hobbes.

Hobbes was to attain not merely his celebrity, but also his later tendency and his favourite occupations, only very late in life, and by very indirect methods.

For when, in his fourteenth year, he repaired to the University of Oxford, he was, according to the spirit of the studies then prevailing there, initiated into logic and physic based upon the principles of Aristotle. For five full years he endeavoured with great zeal to master these subtleties, and in logic especially made great progress. No doubt it had some influence upon his future development that he now devoted himself to the Nominalistic School—that is, to the school which is in principle so closely related to Materialism; and although Hobbes later entirely dropped these studies, nevertheless he remained a Nominalist.

Indeed, we may assert that he gave to this school the boldest development that history exhibits, by combining with the doctrine of the merely conventional value of universal concepts the doctrine of their relativity, very nearly in the sense of the Greek Sophists.

When in his twentieth year, he entered the service of Lord Cavendish, afterwards Duke of Devonshire. This position decided the whole external course of his life, and seems, moreover, to have exercised a permanent influence upon his views and principles.

He undertook the duties of companion or tutor to the son of Lord Cavendish, who was about his own age, and whose son again he was to educate in his later years; so that he stood in intimate relations with three generations of this distinguished house. His life was, therefore, that of a private tutor in the circles of the highest English nobility.

This situation introduced him to the world, and gave him that lasting practical turn which commonly marked the English philosophers of that period; he was emancipated from the narrow circle of Scholastic wisdom and clerical prejudices in which he had grown up; in his frequent journeyings he became acquainted with France and Italy, and in Paris especially he found leisure and opportunity to hold intercourse with the most famous men of the age. At the same time, however, these very circumstances early taught him subordination and inclination to the Royalist and High Church party, in opposition to the efforts of the English democracy and the dissenting sects. His Latin and Greek he soon began to forget in his new position, and by way of compensation speedily picked up on his first travels with the young lord some knowledge of French and Italian. As he everywhere perceived that the Scholastic logic was an object of contempt with all sensible men, he let it completely drop, and began instead to apply himself again zealously to his Greek and Latin, but more on their literary side. But even in these studies he was

helped by his practical sense, which had already turned in the direction of politics.

As then the storms which preceded the outbreak of the English Revolution began to stir, he translated in the year 1628 Thukydides into English, with the express object of frightening his countrymen by an exhibition of the follies of democracy, as they were pictured in the fortunes of the Athenians. The superstition was at that time widely spread, which even in our own days is not entirely extinguished, that history is directly useful as a teacher; that examples drawn from it may be readily applied, and that in the most altered circumstances. The party that Hobbes embraced was already obviously enough the legitimist and conservative, although his own personal way of thinking, and the famous theory that was derived from it, was fundamentally and directly opposed to all conservatism.[15]

It was in the year 1629, when travelling through France with another young nobleman, that Hobbes began to study the Elements of Euklid, for which he soon conceived a strong liking. He was then already forty-one years old, and was now for the first time turning his attention to mathematics, in which he soon attained to the summit of the science as it then was, and which led him to his systematic mechanical Materialism.

Two years later, and upon a fresh tour through France and Italy, he began at Paris the study of the natural sciences, and he soon made the chief object of his investigations a problem which, in the very putting of it, clearly indicates his Materialism, and the answer to which furnishes the watchword to the Materialistic controversies of the coming century. This problem is as follows:—

[15] In the first edition it was here further remarked that this theory would have better suited with the Napoleonic policy of our days. This expression might be liable to misconstruction, since the Bonaparte family seek to adopt a certain legitimism in their policy. It is simpler to point out that the principles of the "Leviathan" may in fact be still better harmonised with the despotism of Cromwell than with the pretensions of the Stuarts to their hereditary divine right.

What kind of motion can it be that produces the sensation and imagination of living beings?

During these studies, which lasted for many years, he was in daily communication with the Minim Friar Mersenne, with whom, moreover, after his return to England in 1637, he opened a correspondence.

As soon, however, as, in 1640, the Long Parliament began its session, he, who had so eagerly declared himself against the popular side, had every reason to withdraw himself; and he betook himself accordingly to Paris, where he was now in constant intercourse with Gassendi, as well as with Mersenne, and not without appropriating much from his views. His stay in Paris lasted through a long series of years. Amongst the refugee Englishmen then gathered in great numbers at Paris, he occupied a much respected position, and was selected to give instruction in mathematics to the future Charles II. Meanwhile he had composed his chief political treatises, the "De Cive" and the "Leviathan," in which, and in the "Leviathan" with special outspokenness, he propounded the doctrine of a downright and paradoxical, but by no means a legitimist Absolutism. This very treatise, in which, moreover, the clergy had discovered many heresies, destroyed for a time his popularity at court. He fell into disgrace, and as he had at the same time violently attacked the Papacy, he was obliged to quit Paris, and avail himself of the much-abused freedom of Englishmen.

After the restoration of the King, he reconciled himself with the court, and lived in an honourable retirement of devotion to his studies. As late as his eighty-eighth year he published a translation of Homer; and in his ninety-first year a Cyclometry.

As Hobbes once lay ill at St. Germain of a violent fever, Mersenne was sent to him to take care that the famous man should not die outside the Romish Church. After Mersenne had announced the power of the Church to remit sins, Hobbes begged that he would rather tell him when

he had last seen Gassendi, and so the conversation immediately turned upon other subjects. The attentions of an English bishop, however, he accepted, on condition that he should confine himself to the written prayers prescribed by the Church.

Hobbes's views upon natural philosophy are partly scattered through his political writings, but partly laid down in the two works "De Homine" and "De Corpore." Thoroughly characteristic of his way of thinking is his introduction to philosophy :—

"Philosophy seems to me to be amongst men now in the same manner as corn and wine are said to have been in the world in ancient time. For from the beginning there were vines and ears of corn growing here and there in the fields, but no care was taken for the planting and sowing of them. Men lived therefore upon acorns; or, if any were so bold as to venture upon the eating of these unknown and doubtful fruits, they did it with danger of their health. . . . And from hence it comes to pass that those who content themselves with daily experience, which may be likened to feeding upon acorns, and either reject or not much regard philosophy, are commonly esteemed, and are indeed, men of sounder judgment than those who, from opinions, though not vulgar, yet full of uncertainty, are carelessly received, do nothing but dispute and wrangle, like men that are not well in their wits."*

Hobbes points out how difficult it is to expel from men's minds a fallacy which has taken root, and which has been strengthened by the authority of plausible authors; and the more difficult because true, that is, exact philosophy scorns not only the "paint and false colours of language, but even the very ornaments and graces of the same," and because the first grounds of all philosophy are "poor, and in appearance deformed."

After this introduction follows *a definition of philosophy*,

* Vol. i. pp. 1, 2, ed. Molesworth, Elements of Philosophy: The First Section, Concerning Body.

which might equally well be called a negation of philosophy, in the ordinary sense of the word:

It is the knowledge of effects or of appearances, acquired from the knowledge we have first of their causes, and conversely of possible causes from their known effects, by means of true ratiocination. All reasoning, however, is computation; and accordingly ratiocination may be resolved into addition and subtraction.[16]

Not only does this definition transform the whole of philosophy into natural science, and completely set aside the transcendental principle, but the Materialistic tendency is still plainer in the explanation of the *object* of philosophy. It consists in this, that we *foresee effects*, and so are able to apply them to the purposes of life. It is well known that the notion of philosophy here expressed has taken such deep root in England, that it is impossible to render the sense of the word "philosophy" by the corresponding German word, and the true "natural philosopher" is nothing but the experimenting physicist. Hobbes appears here as the logical successor of Bacon; and as the philosophy of these men has certainly exercised a considerable influence in furthering the material progress of England, so, conversely, it was itself a product of that inborn national spirit then already hastening to its mighty development—the spirit of a sober and practical people striving after power and wealth.

[16] The definition was still further abridged in the first edition, in order to show as clearly as possible the transition of philosophy into natural science. It runs in the original: "Philosophia est effectuum seu phaenomenon ex conceptis eorum causis seu generationibus, et rursus generationum, quae esse possunt, ex cognitis effectibus per rectam ratiocinationem acquisita cognitio." If we wish to observe more closely the *method* which is also suggested in this definition, we must remember that the words "conceptis" and "quae esse possunt" are by no means superfluous. They denote, in definite opposition to the Baconian induction, the nature of the hypothetical-deductive method, which begins with a theory, and tries and corrects it by reference to experience. Compare what is said further on in the text as to the relation of Hobbes to Bacon and Descartes. The passages quoted are in the treatise De Corpore, i. 1, Opera Latina, ed. Molesworth, i. 2, 3.

In spite of these so obvious relations, it is impossible not to recognise also the influence of Descartes in this definition; and here we must, of course, keep clearly in our minds the Descartes of the "Essay upon Method," without troubling ourselves with the traditional notions of Cartesianism.* In this maiden work, in which Descartes ranks his *physical* theories far above his metaphysical ones in point of importance, he boasts of the former that they open the way, "in room of the speculative philosophy usually taught in the schools, to discover a practical, by means of which, knowing the force and action of fire, water, air, the stars, the heavens, and all the other bodies that surround us, as distinctly as we know the various crafts of our artisans, we might also apply them in the same way to all the uses to which they are adapted, and thus render ourselves the lords and possessors of nature."[17] We might indeed remark, that all this had already been more forcibly said by Bacon, with whose doctrine Hobbes had been thoroughly acquainted from his early youth; but this agreement extends only to the general tendency, while Descartes' method in one very essential point differs from the Baconian.

Bacon begins with induction, and expects by his mounting from the particular to the universal to be able to force his way to the *real* causes of phenomena. When these have been attained, there follows deduction, partly for the filling in of details, partly, however, for the practical application of the truths discovered.

* Compare note 66 in the previous section.

[17] Kuno Fischer and v. Kirchmann, in translating this passage (René Descartes' Hauptschriften, S. 57; and Phil. Bibl., René Descartes' Phil. Werke, i. S. 70 ff.), refer quite rightly to the relationship between Descartes and Bacon. Yet when the latter (*loc. cit.* Anm. 35) tries to claim Descartes as an *empiricist*, and to deduce the 'Cogito ergo sum' (as result of self-observation!) from this tendency, he entirely mistakes the nature of the deductive process, which may in the one sphere be regulated by experience, but not in the other. Descartes himself was still quite clear enough on this point in the year 1637, and accordingly claimed an objective validity for his physical theories, but not for his transcendental speculations.

Descartes, on the contrary, proceeds, in fact, synthetically, and yet not in the sense of Plato and Aristotle, with pretensions to an absolute certainty of his principles (this modification was reserved for the reactionary development of his metaphysic!), but with the distinct consciousness that the real demonstrative power lies in experience. He proposes the theory tentatively, explains the phenomena by means of it, and so tests the theory by experience.[18] This method, which may be designated as the hypothetico-deductive method (although, if classified according to the *nervus probandi*, it belongs to induction, and must be treated under inductive logic), stands nearer to the actual procedure of scientific inquiries than the Baconian, although neither of them adequately represents the true nature of scientific inquiry. Hobbes, however, has here no doubt consciously sided with Descartes against Bacon, whilst later Newton again (of course more in theory than in actual practice!) reverted to Bacon.

Hobbes deserves high praise for this, that he recognised frankly and unreservedly the great achievement of modern science. While Bacon and Descartes were still refusing it, Hobbes gave to Copernicus the place of honour that was his due, just as, in short, in nearly all controverted points, with perhaps the single exception of the doctrine of vacuum, into the denial of which he allowed himself to be seduced by Descartes, he declared distinctly and decidedly for the rational and correct view. In this respect—as well as for the determination of his tendency—the dedication to his treatise "De Corpore" is of great interest.[19] There it is

[18] Especially decisive is the following passage of the "Dissertatio de Methodo" (near the end): "Rationes enim mihi videntur in iis (that is, in the 'hypotheses' of Dioptrics, and so on) tali serie connexae, ut sicut ultimae demonstrantur a primis, quae illarum causae sunt, ita reciproce primae ab ultimis, quae ipsarum sunt effecta, probentur. Nec est quod quis putet, me hic in vitium, quod Logici Circulum vocant, incidere; nam cum experientia maximam effectuum istorum partem certissimam esse arguat, *causae a quibus illos elicio, non tam iis probandis quam explicandis inserviunt, contraque ipsae ab illis probantur.*"

[19] To the Earl of Devonshire, London, 23d April 1655, Opera Latina, ed. Molesworth, vol. i. p. vii.

said that the doctrine of the earth's diurnal revolution was the invention of the ancients, but that both it and astronomy, that is, celestial physics, springing up together with it, were, by succeeding philosophers, *strangled with the snares of words.* And therefore the beginning of astronomy, except observations, is not to be derived from farther time than from Nicolaus Copernicus, who, in the age next preceding the present, revived the opinion of Pythagoras, Aristarchos, and Philolaos. After this, Galilei had first opened the gate of natural philosophy (physics), and lastly, the science of man's body had been founded by Harvey through his doctrines of the circulation of the blood and the generation of animals. Before this there had been nothing but every man's experiments by himself, and the natural histories that were no certainer than civil histories. But then all the physical sciences had been extraordinarily advanced by Kepler, Gassendi, and Mersenne, while Hobbes vindicates for himself (referring to his book "De Cive") the foundation of 'Civil Philosophy.'

In old Greece, he goes on, there walked a certain phantasm, for superficial gravity a little like philosophy, though full within of fraud and filth. With Christianity had been mingled first some harmless sentences of Plato, but afterwards many foolish and false ones out of Aristotle; and so, instead of the faith, there entered a thing called theology, which, halting on one foot (because she rests partly on the Holy Scripture, but partly on the Aristotelian philosophy), is like the Empusa, and has raised an infinite number of controversies and wars. This Empusa cannot be better exorcised than by the establishing of a State religion instead of the opinions of private men, at the same time basing religion upon Holy Scripture, but philosophy upon *natural reason.*

These ideas are very boldly carried out, especially in the "Leviathan," and we are surprised now by perverse paradoxes, and now by the natural directness and keenness of his judgment. With regard to his opposition to

Aristotle, there is a specially notable passage in the forty-sixth chapter, where he indicates the confusion of name and thing as the root of the evil. Hobbes undoubtedly hits the nail upon the head when he considers the hypostasising of the copula EST as the original source of innumerable absurdities. Aristotle has made 'being' into a thing, just as though there were in the universe an actual object which could be designated by the term 'being!' We may imagine to ourselves what would have been Hobbes's judgment upon Hegel!

His attack upon theology, which is treated as mischief-making abomination, is only apparently a defence of belief in the letter. It is, in truth, much rather allied with a concealed aversion to religion. But Hobbes has a quite uncommon hatred of theology, in so far as she is connected with the claims of ecclesiastical supremacy. This he absolutely rejects. The kingdom of Christ is not of this world, and therefore the spiritual authority has no claim to any sort of obedience. Accordingly, Hobbes attacks with especial animosity the doctrine of papal infallibility.[20] Generally speaking, also, it is a necessary consequence of his definition of the notion of philosophy that any idea of a speculative theology is quite impossible. The knowledge of God is in no way a part of science, because as soon as it is no longer possible to add or to subtract, the province of reflection ceases. It is true, indeed, that the connection between cause and effect leads us to the assumption of a last cause of all motion, a first moving principle; but the further definition of its nature remains somewhat quite unthinkable, and contradictory in thought, so that the actual recognition and

[20] The doctrine of papal infallibility is controverted by Hobbes in the "Leviathan," c. xlii., ed. Molesworth, iii. 554, foll. This polemic forms one portion of the elaborate refutation of Cardinal Bellarmine's book in favour of the Jesuit doctrine of the supremacy of the Pope over all the princes of the earth. The whole argument shows that Hobbes recognised the full force of the dangers contained in these pretensions — dangers which are only in our own days becoming visible to everybody.

completion of the idea of God must remain as the function of religious faith.

The blindness and thoughtlessness of faith has been in no system so expressly stated as in this, although Bacon, and even Gassendi, occupy in many respects a very similar position. And accordingly Schaller very excellently says of the attitude of Hobbes to religion: "How this is psychologically possible is also a mystery, so that it is first necessary to have faith in the possibility of such a faith."[21] But the true point of support upon which this theory of faith rests is found in Hobbes's political system.

Hobbes, as is well known, is regarded as the founder of the absolutist theory of government, which he deduces from the necessity of escaping the war of all against all by means of a supreme will. He assumes that man, whose thoughts are naturally for the preservation of his personal interests, even though peaceably disposed, yet cannot live without hurting the interests of others, since he only struggles to preserve his own. Hobbes denies the Aristotelian principle that man, like the bee, the ant, the beaver, is, from the very constitution of his nature, a political animal. It is not through political instinct, but through fear and reason, that man enters into union with his fellows, with the object of preserving their common

[21] Schaller, Gesch d. Naturphil., Leipzig, 1841, S. 82. But we need not seek any clearer explanation of this point in Schaller; very able, and in the main certainly correct, is the judgment of Kuno Fischer as to the position of morality and religion in Hobbes (Baco von Verulam, S. 393 ff., E. T. Oxenford, p. 420 foll.); yet in the too one-sided reference of this whole tendency to Bacon, while Descartes is conceived as the exact antithesis, there is a defect, which is due to the Hegelian method of classification, which makes everything very clear, but not unfrequently does violence to the often very complicated threads. A necessary consequence of this is that Kuno Fischer, who as a rule estimates such phenomena with delicate tact, has failed to recognise the worldly frivolity which, in Descartes, underlies his reverential subjection to the judgment of the Church. Entirely hypocritical Hobbes's religious sentiments can hardly have been; at least, he was certainly an honourable partisan of the Church of his country in opposition to Catholicism; and it was probably only in this sense that men like Mersenne and Descartes—and in a lesser degree even Gassendi—were zealous Catholics.

security. With peculiar consistency, moreover, Hobbes denies even any absolute difference between good and evil, virtue and vice. The individual man, therefore, cannot succeed in giving any established validity to these notions either: he allows himself, in fact, to be guided by his interests; and so long as the higher will of the State does not exist, this can as little be made a subject of reproach to him as to the beast of prey that destroys the weaker animals.

Although these principles are strictly in harmony with each other and with the whole system, Hobbes might at the same time, without any inconsistency, have admitted as probable at least the existence of a political impulse, and even of a natural gravitation, to the adoption of such customs as guarantee the happiest possible condition of all men. The denial of the freedom of the will, which is a matter of course in Hobbes's system, by no means implies an egoistic ethic as its necessary result. It is simply that, with an unnatural extension of the idea, even the effort to make one's surroundings happy, in so far as this gratifies a natural impulse, is called egoistic. Hobbes, however, knows nothing of this unnatural extension of the idea: the egoism of his State-founders is a pure, complete, and unsophisticated egoism, in the sense in which this notion indicates just the opposition of personal interests to foreign and to joint interests. Hobbes, who undervalued the euristic value of feeling, in rejecting the natural instinct to political life, and to the intellectual apprehension and appropriation of the general interests, missed the one path which could have conducted him even from his Materialistic standpoint to higher ethico-political principles. In rejecting the Aristotelian *ζῶον πολιτικόν*, he enters upon the path which, co-operating with the rest of his fundamental doctrines, must necessarily lead him into paradoxical consequences. It is just because of this unshrinking consistency that Hobbes, even when he goes wrong, is still so extraordinarily instructive;

and we can, in fact, scarcely name a second author who has been so unanimously abused by the disciples of all schools, while at the same time he stimulated them all to greater clearness and precision.

The first founders of the State, as later in Rousseau, so in Hobbes also, make a compact; and in this respect his theory is thoroughly revolutionary—knowing nothing of an original divine arrangement of ranks, of hereditary divine right to the crown, and conservative fancies of that kind.[22] Hobbes holds the monarchy to be the best form of government, although he thinks that, of all his principles, this has been least satisfactorily demonstrated. Even the hereditariness of monarchy is a mere arrangement of utility; but that the monarchy, where it exists, must be absolute, follows simply from the demand that the governance of the State, even when it is intrusted to a society or an assembly, must possess absolute force.

For his egoistical rabble of human beings has not the slightest inclination by nature to maintain any form of constitution or to observe any laws: fear alone can compel it to this. In order, therefore, that the multitude may at least continue united, and the war of all against all may be avoided as the greatest possible evil, the egoism of the rulers must have the force to assert itself absolutely, so as to keep in check the unbridled, and, in its totality, the very much more harmful egoism of all its subjects.

The government, besides, cannot be kept in check; if it violates the constitution, then the citizens, to offer a successful resistance, must *trust one another*, and that is what the egoistic creatures cannot do; but each individual is

[22] The formula out of which grows the unity of the State runs thus:—"Ego huic homini, vel huic coetui, auctoritatem et jus meum regendi meipsum concedo, ea conditione, ut tu quoque tuam auctoritatem et jus tuum tui regendi in eundem transferas." As each individual speaks thus to every other, the atomistic multitude becomes a unity which we call a State. "Atque haec est generatio magni illius Leviathan, vel ut dignius loquar, mortalis Dei."—Leviathan, c. xvii., iii. 131, ed. Molesworth. As to the *natural equality* of all men (in opposition to Aristotle, who speaks of born masters and slaves), comp. ibid. c. xv., p. 118.

weaker than the government. Why then need it stand upon ceremony?

That every revolution that is strong enough is also justified, as soon as it succeeds, in establishing any new form of authority, is a necessary consequence of this system: tyrants need not comfort themselves with the proverb, 'Might comes before right,' since, in fact, might and right are absolutely identical. Hobbes does not care to linger among these consequences of his system, and rather loves to paint the advantages of an absolute hereditary monarchy; but all this does not modify the theory. The name "Leviathan" is only too significant of this monster of a State, which is guided by no higher considerations, which, like a god upon earth, ordains law and judgment, right and possession, at its own will, and even arbitrarily determines the ideas of *good* and *evil*,[23] and in return assures to all those who bow the knee before it and do it sacrifice, protection for their lives and property.

To the absolute authority of the State, moreover, belongs the right of prescribing to its subjects their religion and their whole way of thinking. Exactly like Epikuros and Lucretius, so Hobbes also derives religion from terror and superstition; but while they for this very reason declare that to rise above the limits of religion is the highest and noblest duty of the philosopher, Hobbes knows how to turn this common material to account for the purposes of his State. His real view of religion is so trenchantly expressed in a single sentence, that we cannot but be surprised at the unnecessary breath that has often been spent upon the theology of Hobbes. He lays down the following

[23] So long as the State does not interfere, everything, according to Hobbes, is good for any particular man that is the object of his desire (Leviathan, c. vi. iii. 42, ed. Molesw.). Conscience is nothing but a man's secret consciousness of his deeds and words, and this expression is often misapplied to private opinions, which, out of mere self-will and vanity, are held inviolable (*loc. cit.*, c. vii. p. 52). That any private person should make himself the judge of good and evil, and hold it a sin to do anything against his conscience, is reckoned among the worst offences against civic obedience (c. xxix. p. 232).

definition: "*Fear of power invisible, feigned by the mind or imagined from tales publicly allowed,* RELIGION: *not allowed,* SUPERSTITION."[24] When Hobbes, then, in the same book, with the utmost calmness mentions as simple facts the building of the tower of Babel, or the miracles worked by Moses in Egypt,[25] we must nevertheless recall with astonishment his definition of religion. The man who compared the miracles to 'pills' which we must swallow down without chewing[26] can, in fact, only not have held these miraculous stories for superstitions, because in England the authority of the Bible is established by the supreme political power. When, therefore, Hobbes is speaking upon religious subjects, we must constantly distinguish these three cases. *Either* Hobbes speaks directly from his own system, and then he views religion as only one form of superstition;[27] *or* he is referring incidentally to some particular points, when he only practically applies a principle of his system—then he views the doctrines of religion as simple facts, with which, however, science has nothing more to do; Hobbes is then sacrificing to Leviathan.

[24] Leviathan, c. vi. p. 45: "Metus potentiarum invisibilium, sive fictae illae sint, sive ab historiis acceptae sint publice, *religio* est; si publice acceptae non sint *superstitio*." Hobbes indeed goes on to add: "Quando autem potentiae illae re vera tales sunt, quales accepimus, *vera religio;*" but this is only an apparent saving clause. For as the State alone decides which is to be the accepted religion, and as it must not be contradicted for political reasons, obviously the notion of "vera religio" is a merely relative one—and we may be the more content that it should be so, since in a scientific sense there is nothing to be said as to religion in general.

[25] Comp. Kuno Fischer, Baco von Verulam, S. 404, E. T. 430. Leviathan, c. xxxii. iii. 266.

[26] Comp. Leviathan, c. iv. iii. 22: "Copia haec omnis . . . interiit penitus ad turrem Babel, quo tempore Deus omnem hominem sermonis sui, propter rebellionem, oblivione percussit." Ibid., c. xxxvii. p. 315: "Potestatem ergo illi dedit Deus convertendi virgam, quam in manu habebat, in serpentem, et rursus serpentem in virgam," &c.

[27] Hobbes is speaking from this standpoint, for example, in treating of the *origin* of religion. This is referred absolutely to some natural characteristic or other of man (comp. Lev., c. xii. *ad init.*), among others, to the inclination to hasty conclusions, and so on. And so we have this summary (p. 89, Eng. Works, iii. 98): "In these four things—opinion of ghosts, ignorance of second causes, devotion towards what men fear, and taking of things casual for prognostics—consisteth the natural seed (*semen naturale*) of religion."

The worst contradictions are thus, at least in form, explained away, and we have only the *third* case left—where Hobbes is offering to Leviathan, as it were *de lege ferenda*, respectful suggestions for the purification of religion and for the abolishing of the worst superstitions. Here we must indeed recognise that Hobbes does all that is in his power to lessen the gulf between faith and knowledge. He distinguishes the essential and the non-essential elements of religion; he tries to explain away obvious contradictions between Scripture and faith—as, for example, the doctrine of the revolution of the earth—by distinguishing between the mode of expression and the moral purpose of Scripture; he explains 'possession' as a disease; maintains that miracles have ceased since the founding of Christianity, and even allows us to see that the very miracles are not miracles to everybody.[28] If we add to this the remarkable rudiments of a historico-critical treatment of the Bible, we easily see that the whole armoury of Rationalism is already to be found in Hobbes, and only needs to have its range of application extended.[29]

Next, as to his theory of *external nature*, we must first observe that Hobbes absolutely identifies the idea of body with that of substance; so that when Bacon carries on a controversy against the immaterial substance of Aristotle, Hobbes has already got beyond him, and without hesitation distinguishes between the 'body' and the 'accidens.' Hobbes declared everything to be body that, independently of our thought, occupies a portion of space, and coincides with it. As opposed to this, the accident is not a really objective thing, like body, but it is the way in which the body is conceived. This distinction is really sharper than

[28] Comp. amongst others, the following passages of the "Leviathan," Op. Lat. iii. 64, foll. 207: "Miracula enim, ex quo tempore nobis Christianis positae sunt leges divinae, cessaverunt." "Miracula narrantibus credere non obligamur." "Etiam ipsa miracula non omnibus miracula sunt."

[29] Comp. for instance "Leviathan," c. xxxii. 276: "Libri testamenti novi ab altiore tempore derivari non possunt, quam ab eo, quo rectores ecclesiarum collegerant," and what follows.

that of Aristotle, and, like all Hobbes's definitions, betrays the mathematically-trained mind. In other respects Hobbes adheres to the explanation that the accident is in the subject, in such a way that it cannot be regarded as any part of it, but that it may be away, and yet the body does not cease to be. The only constant accidents which cannot be wanting without the body's thereby ceasing to exist are extension and figure. All others, such as rest, motion, colour, hardness, and so on, may vary, while the body itself remains, and they are, therefore, not corporeal, but simply modes in which we conceive the body. Motion Hobbes defines as the 'continual relinquishing of one place and acquiring of another,' where it is obviously overlooked that the idea of motion is already contained in the 'relinquishing' and 'acquiring of' a place. As compared with Gassendi and Bacon, there appears not unfrequently in Hobbes's definitions a return to Aristotelianism, if not in principle, at least in the mode of expression—a fact which is to be explained by the course of his intellectual development.

In the definition of matter, this inclination towards Aristotle is particularly evident. Hobbes declares that matter is neither one of the bodies nor a special body distinct from all others, and it follows, therefore, that it is in fact nothing else than a mere name. Here the Aristotelian conception is obviously taken as the foundation, but it is improved upon in a way thoroughly corresponding to the improvements in the notion of 'accident.' Hobbes, who sees that possibility or chance cannot be in things, but only in our conception of things, quite rightly corrects the main defect of the Aristotelian system, by substituting for the accident as an accidental element in the *object* the accidental *subjective* conception. Instead of matter as a substance, that *can become* anything, and *is* nothing definite, comes in the same way the statement that matter is the body conceived generally, that is, an abstraction of the thinking subject. The permanent element, which persists

through all changes, is for Hobbes not matter, but the 'body,' which only changes its accidentia, that is, is now conceived by us in one way and now in another. But at the bottom of this changing conception there lies something permanent, namely, the motion of the parts of the body. And therefore when an object changes its colour, becomes hard or soft, breaks into particles, or combines with new particles, the original quantity of the corporeal thing persists; we *name*, however, the object of our perception differently in accordance with the new impressions that it makes upon our senses. Whether we suppose a new body to be the object of our perception, or only attribute new qualities to the old body, depends merely upon the language in which we express our conceptions, and so indirectly from our own will, since words are but counters. And thus, too, the distinction between body (substance) and accident is a merely relative one, dependent upon our conceptions. The real body, which, by the continual movement of its parts, excites the corresponding movements in our organ of sensation, is subject to no other change whatever than the mere motion of its parts.

It is worth remarking here that Hobbes, by means of his doctrine of the relativity of all concepts, as well as his theory of sensation, does in fact outrun Materialism much as Protagoras outran Demokritos. That Hobbes was not an Atomist we have already seen; but looking also at the whole connection of his ideas as to the nature of things, he could not possibly have been an Atomist. As he applies it to all other concepts, so he applies the category of relativity to the idea of 'great' and 'small' in particular. The distance of many of the fixed stars from the earth is so great, he says, that, as compared with it, the whole distance of the earth from the sun appears as a mere *point;* so also is it with the particles which to us appear small. There is in this direction also an infinity; and what the human physicist regards as the *smallest* particle, because he needs to assume it for his theories, is in its turn a

world with innumerable gradations from the greatest to the smallest.[30]

In his theory of *sensation*, we have already in germ the sensationalism of Locke. Hobbes supposes that the movements of corporeal things communicate themselves to our senses by transmission through the medium of the air, and from thence are continued to the brain, and from the brain finally to the heart.[31] To every movement corresponds an answering movement, in the organism, as in external nature. From this principle of reaction Hobbes derives sensation; but it is not the immediate reaction of the external organ that constitutes sensation, but only the movement that starts from the heart, and then returns from the external organ by way of the brain, so that an appreciable time always elapses between the impression and the sensa-

[30] De Corpore, iv. 27 (i. 362–364, ed. Molesw.). Here also occurs (p. 364) a very noteworthy passage in respect of method: "Agnoscunt mortales magna esse quaedam, etsi finita, ut quae vident ita esse; agnoscunt item infinitam esse posse magnitudinem eorum quae non vident: *medium* vero esse inter *infinitum* et eorum quae vident cogitantve *maximum*, non statim nec nisi multa eruditione persuadentur." When, indeed, the theoretical question of divisibility, and of the relativity of greatness and smallness, no longer comes into view, Hobbes has no objection to make to describing the "corpuscula" as "atomi," as, for instance, in his theory of gravitation, De Corpore, iv. 30 (p. 415).

[31] A more particular inquiry into the doctrine of 'conatus' as the form of motion here referred to is beyond our present object. For a fuller exposition see in Baumann, Die Lehren von Raum, Zeit und Mathem., i. S. 321 ff. The special fault found with the theory at S. 327, that the sensation is only produced by the conatus returning from the heart, seems to me to be not wholly justified; for even although, according to Hobbes's theory, a reaction against the impact of the object takes place instantaneously in the part first acted upon, yet this by no means hinders the propagation of the motion under ever new actions and reactions towards the inward parts, where the motion can become regressive. Let us suppose, for example, for simplicity's sake, a series of elastic balls placed in a straight line, A, B, C, . . . N, and let us suppose that A impinges directly upon B, the impulse being then propagated through C and so on to N; let N strike at right angles against a fixed wall, then the motion will return right through the whole series, without being hindered by the circumstance that sometime before B has also reacted against A, thus limiting its movement. It must, however, of course, be allowed to the originator of the hypothesis to identify with the sensation not the first (limiting) reaction of B against A, but the returning impact from B to A, a view which, there can be no doubt, suits the facts incomparably better. Comp. the remarks in § 4 (i. p. 319 sq., ed. Molesw.) on the effect of an interruption of the communication.

tion. By means of this regressiveness of the movement of sensation, which is an 'endeavour' (conatus) towards the objects, is explained the transposition outwards of the images of sense.[32] The sensation is identical with the image of sense (phantasma), and this again is identical with the motion of the 'conatus' towards the objects; not merely *occasioned* by it. And thus Hobbes by a bold phrase hews asunder the Gordian knot of the question how the sensation as a subjective condition is related to the movement; but the matter is thereby made none the clearer.

The subject of the sensation is the man as a whole; the object is the thing which is felt: the images, however, of the sense-qualities, by means of which we perceive the thing, are not the thing itself, but a motion originating within us. And thus there does not proceed from shining bodies any light, or from sounding bodies any noise, but only certain forms of motion from each. Light and sound are sensations, and first arise as such within us as reactionary motion proceeding from the heart. From this results the sensationalistic consequence that all so-called sense-qualities, as such, belong not to things, but originate only in ourselves. Coupled with this, however, is the Materialistic principle that even human sensation is nothing but the motion of corporeal particles, occasioned by the external motion of things. Hobbes never thought of abandoning this Materialistic principle in favour of a consistent Sensationalism, because, like Demokritos in antiquity, he started from the mathematical and physical consideration of external things. Therefore his system remains an essentially Materialistic system, in spite of the germs of Sensationalism which it bears within it.

With regard to his view of the universe, Hobbes con-

[32] De Corpore, iv. xxv. 2 (i. p. 318): "Ut cum conatus ille ad intima ultimus actus sit eorum qui fiunt in actu sensionis, tum demum ex ea reactione aliquandiu durante ipsum existit phantasma; quod propter conatum versus externa semper videtur tanquam aliquid situm extra organum."

fines himself exclusively to the phenomena which are knowable, and can be explained by the law of causality. Everything of which we can know nothing he resigns to theologians. A remarkable paradox is contained in the doctrine of the corporeality of God, which is, of course, since it contradicts an Article of the Anglican Church, not exactly asserted, but only suggested as a very possible inference.[33] If one could have overheard a confidential conversation between Gassendi and Hobbes, one might perhaps have caught a dispute on the question whether the all-animating heat or the all-embracing ether must be regarded as the Deity.

[33] Compare as to this especially the Appendix to the "Leviathan," c. i., where it is insisted that everything possessed of real independent existence is body. Then it is suggested that even all spirits, such as the air, are corporeal, although it may be with infinite gradations of fineness. Finally, it is pointed out that such expressions as "incorporeal substance" or "immaterial substance," are nowhere found in Holy Scripture. It is true that the first of the Thirty-nine Articles teaches that God is without "body" or "parts," and, therefore, this will not be expressly denied; but the twentieth Article says that the Church may require nothing to be believed that is not founded upon Holy Writ (iii. 537 ff.).

The result of this obvious contradiction, then, is, that Hobbes insists, at every opportunity, upon the incomprehensibility of God, attributes to Him only negative predicates, and so on; while, by the citation of authorities such as Tertullian (iii. 561), by frequent discussions of Biblical expressions, and especially by the cunning employment of premisses whose final conclusion is left to be drawn by the reader, he tries everywhere to excite the feeling that the idea of God would be very intelligible if we conceived Him either as a body or as a phantasm, that is, nothing; and that the whole incomprehensibleness is due to this, that we have ever been bidden to speak of God as "incorporeal." Comp., *inter alia*, Opera, iii. 87, 260 sq., 282 (here, in particular, the words are very clear: "Cum natura Dei incomprehensibilis sit, et nomina ei attribuenda sint, *non tam ad naturam eius, quam ad honorem, quem illi exhibere debemus congruentia.*" The quintessence of Hobbes's whole theology is probably, however, most clearly expressed in a passage in the "De Homine," iii. 15, Op. ii. 347 sq., where it is bluntly said that *God rules only through nature*, and that His will is only announced through the State. We must not indeed conclude from this that Hobbes identified God with the *sum* of nature—pantheistically. He seems rather to have conceived as God a *part* of the universe—controlling, universally spread, uniform, and by its motion determining mechanically the motion of the whole. As the history of the world is an outflow of natural laws, so the power of the State is, as the actually effective might, an outflow of the divine will.

CHAPTER III.

THE LATER WORKINGS OF MATERIALISM IN ENGLAND.

THERE is almost a full century of interval between the modern development of Materialistic systems, and between that reckless authorship of a De la Mettrie, who dwelt with special pleasure on just those aspects of Materialism which must be repugnant to the Christian world. It is true, indeed, that even Gassendi and Hobbes had not entirely avoided the ethical consequences of their systems; but both had contrived a means of making their peace with the Church—Gassendi by his superficiality, Hobbes by an arbitrary and unnatural inference. If there is, in this respect, a fundamental distinction between the Materialists of the seventeenth and those of the eighteenth century, yet the chasm between them, apart from purely ecclesiastical dogma, is by far the broadest in the sphere of ethic. Whilst De la Mettrie, quite in the manner of the philosophical dilettanti of ancient Rome, with a frivolous complacency made desire the principle of life, and by his low conception still tainted the memory of Epikuros after thousands of years, Gassendi had in every way brought forward the more serious and deeper aspect of the Epikurean ethic. Hobbes, though only after curious subterfuges, ended by adopting the current semi-Christian, semi-bourgeois morality, which he regarded indeed as narrow, but as justifiably narrow. Both lived very simply and honestly, according to the ordinary ideas of their time.

In spite of this great distinction, the Materialism of the seventeenth century, with all its affinities even to the

'Système de la Nature,' forms one connected chain, while the present, although again between De la Mettrie and Vogt or Moleschott there is just such an interval of a century, must be regarded as something entirely independent. The philosophy of Kant, and still more the great scientific achievements of the last few decades, demand this special estimate as distinctly from the standpoint of theoretical science, while, on the other hand, a glance at the material conditions and the social circumstances must lead us to embrace in an inner unity the whole period down to the French Revolution.

If we first direct our attention to the state and civil society, we shall perceive an analogy between those two earlier periods which markedly separates them from the present. Hobbes and Gassendi lived at the courts, or in the aristocratic society of England and France. De la Mettrie was protected by Frederic the Great. The Materialism of both the past centuries found its support in the worldly aristocracy, and the difference of its relation to the Church is partly a result of the different attitudes taken up by the secular aristocracy and the courts towards the Church. The Materialism of our own times has, on the contrary, a thoroughly popular tendency; it rests upon nothing but the right to express its convictions and the receptivity of a great public, to whom the results of science, variously combined with Materialistic doctrine, are made accessible in the most convenient shape; and therefore, to understand the ever-important transition from the Materialism of the seventeenth to that of the eighteenth century, we must keep before us the relations of the higher classes of society, and the changes which were at this time taking place amongst them.

One most striking feature was the peculiar direction of all the efforts that appeared in the second half of the seventeenth century in England. After the restoration of the monarchy, there had there ensued a violent reaction against the eccentric and hypocritical austerity of

the Puritanism which had dominated the Revolutionary period.

Patronage of Catholicism went, at the court of Charles the Second, hand in hand with riotousness of living. The statesmen of that time were, according to Macaulay,[34] perhaps the most corrupt portion of a corrupt society, and their frivolity and luxuriousness were only exceeded by the shamelessness with which, devoid of all political principles, they pursued politics as a plaything of their ambition.

The character of frivolity in religion and morals was the character of the courts. France, it is true, was in the van, and set the fashion, but France at this period was in the full bloom of her so-called 'classical literature,' and the brilliancy of her influence abroad, as well in literature as in politics, constituted the age of Louis the Fourteenth, and gave to the efforts of the nation as well as of the court a certain impetus and a worth which carried them far beyond the Materialistic tendency towards the useful. But in the meantime the growing centralisation, combined with the oppression and plundering of the people, prepared that great mental fermentation which was to result in the Revolution. In France, as in England, Materialism took root; but in France only its negative elements were taken up, while in England men began to apply its principles in ever-increasing measure to the direction of the whole life of the people. And hence we may compare the Materialism of France with that of the Roman Empire; men adopted it in order to corrupt it, and to be corrupted by it. It was quite otherwise in England. Here also frivolity reigned among the upper classes. One might be credulous or not, because one had no principles either way, and was at bottom both, according as either favoured one's passions. But Charles the Second had learned from Hobbes, besides the doctrine of his own omnipotence,

[34] Macaulay, Hist. of Engl., i. c. ii. Comp. especially the sections "Change in the Morals of the Community," and "Profligacy of Politicians."

something better also. He was a zealous physicist, and had a laboratory of his own; and the whole aristocracy followed his example. Even Buckingham took to chemistry, which was as yet, of course, not devoid of the mystic attraction of alchemy—the search for the philosopher's stone. Peers, prelates, and lawyers devoted their leisure hours to experiments in hydrostatics. Barometers were manufactured and optical instruments of the most varied uses. Elegant ladies of the aristocracy drove to the laboratories to have shown to them the experiments of electric and magnetic attraction. The aimless curiosity and idle dilettanteism of the great allied themselves with the serious and solid studies of specialists, and England entered upon a path of scientific progress which appears as the fulfilment of the prophecies of Bacon.[35] There was aroused on every hand a genuine Materialistic spirit, which, far from being destructive in its tendency, rather led England at this very time to an unheard of development, to which in France the fragments of the renascent Epikureanism united themselves with increasing bigotry, in order to introduce that restless oscillation between extremes which characterises the period previous to Voltaire's appearance; and it was a necessary result that here the spirit of frivolity increased, while it formed in England a transitional phenomenon, appearing just while the spiritual principles of the Revolution were passing into the Materialistic principles of the great mercantile epoch.

"The war between wit and Puritanism," writes Macaulay of this time, "soon became a war between wit and morality. Whatever the canting Roundhead had regarded

[35] Macaulay, Hist. of Engl., i. c. iii., "State of Science in England;" comp. also Buckle, Hist. of Civilisation, ii. 363 ff., where particular mention is made (p. 371) of the influence of the foundation of the Royal Society, in whose activity centred the inductive spirit of the time. Hettner, Literaturgesch. d. 18 Jahrh., i. (3d ed.), p. 17, calls the foundation of the 'Regalis Societas Londini pro scientia naturali promovendâ' (15th July 1662) "die ruhm vollste That Karls II." (the most glorious act of Charles II.), which is, indeed, strictly speaking, not saying very much.

with reverence was insulted; whatever he had proscribed was favoured. As he never opened his mouth except in Scriptural phrase, the new breed of wits and fine gentlemen never opened their mouths without the vilest oaths. In poetry, the licentious style of Dryden replaced that of Shakespeare, after the Puritanical hatred of secular poetry in general had suppressed all talent." [36]

About this time the female parts on the stage, which had been previously played by youths, were first assigned to actresses: the demands on their license were ever greater and greater, and the theatre became a centre of immorality. But increasing luxuriousness went hand in hand with increasing productiveness, until soon the former was more than balanced by the latter. In the keen competition of the race after wealth, the complacency of the earlier period succumbed, with a portion of its vices, and the Materialism of pleasure was supplanted by the Materialism of political economy.[37] Commerce and industry rose to a height which earlier times had never conceived. The means of transit were improved, long-abandoned mines were reopened, all with the energy peculiar to epochs of material production, and which, wherever it is powerfully excited, reacts favourably upon energy and enterprise in other respects. At this time began those enormous towns of England, partly to spring up out of the ground, partly to develop in the gigantic proportions which, within less than two centuries, made England the wealthiest country in the world.[38]

[36] Hist. of Engl., i. c. iii., "Immorality of the Polite Literature of England." Comp. further on this point, Hettner, Literaturg. des 18 Jahrh., i. 107 foll.

[37] Although the classical political economy of the English only later arose as a developed science, its roots lie in this period. And the 'Materialism' of political economy appears in full development so early as in Mandeville's Fable of the Bees (1708). Comp. Hettner, Litg. d. 18 Jahrh., i. 206 foll.; comp. also Karl Marx, Das Kapital, i. 339, Anm. 57, on Mandeville as predecessor of Adam Smith, and ibid., 377, Anm. 111, on the influence of Descartes and of the English philosophers, particularly Locke, upon political economy. On Locke, comp. further Note 74 below.

[38] Macaulay, Hist. of Engl., i. c. iii., "Growth of the Towns."

In England the Materialistic philosophy burst into luxuriance. There is no question that the enormous forward movement of this country is quite as intimately connected with the acts of philosophers and men of science, from Bacon and Hobbes to Newton, as the French Revolution with the appearance of Voltaire. It may just as easily be overlooked, however, that the philosophy which had passed into life and practice had, in doing so, ceased its independent existence. The completion of Materialism in Hobbes admitted, in fact, of no further development of the doctrine.

Speculative philosophy retired, and left the field to practical tendencies. Epikuros had wished to help the individual, and that by means of his philosophy itself; Hobbes endeavoured to benefit the whole of society, but not directly through his philosophy, but rather through the results to be attained by it. With Epikuros the essential object is to set aside religion; Hobbes employs religion, and those citizens who favour the popular superstition as to nature must seem to him better citizens than those who reach the same result by the way of philosophy. The object of belief is for the masses better and more cheaply attained when belief is propagated simply from generation to generation, than if the individuals should only, through respect for authority and acquiescence in its necessity, succeed in regulating their religious ideas.

And, moreover, philosophy is a superfluity in the collective economy of the civic life as soon as the citizens can secure all its results without the philosophy, *i.e.*, as soon as they, as a rule, submit to the power of the State, only revolt when they have some prospect of success, and, in ordinary times, devote their whole strength and activity to the material improvement of their position, to the production of new benefits, and the perfection of existing arrangements. As philosophy is only of advantage in furthering this line of conduct, as the best and most profitable, it will be obviously a simple saving of

labour if we succeed in persuading the people to this conduct without communicating the doctrines of the philosophy to every individual. Only for kings or their advisers, or for the heads of the aristocracy, will the philosophy be of value, since these must take care to keep the whole in its course. These stringent inferences from the doctrine of Hobbes look, in fact, as though they had been simply abstracted from the more recent intellectual history of England, so closely has the nation, on the whole, developed itself after the pattern prescribed by Hobbes. The higher aristocracy retains a personal freedom of thought, together with a sincere, or shall we say, what has become a sincere, respect for ecclesiastical institutions. Men of business regard all doubt of the verities of religion as 'unpractical;' for the arguments for or against their theological foundations they have no appreciation; and if they shudder at 'Germanism,' that is rather with reference to the security of the *present* life than with any reference to the expectation of a life *beyond* the grave. Women, children, and the sentimental are unreservedly devoted to religion. But in the lower classes of society, for whose maintenance in a state of subjection a life of refined sentiment does not seem requisite, there is again scarcely any remnant of religion, except the fear of God and the clergy. Speculative philosophy is thought superfluous, if not mischievous. The notion of a philosophy of nature has passed into that of physical science; and a modified selfishness, which has secured an excellent understanding with Christianity, is fully recognised by all classes of society as the only foundation of individual or public morality.

We are far indeed from referring to the influence of a Hobbes this wholly original, and, in its way, model development of modern England; nay, it is much rather the lively characteristic of the nature of this people in their process of development; it is the sum of all the historical and material circumstances, from which both are to be explained—the philosophy of Hobbes, and the subsequent

turn taken by the national character. But at all events, we must regard Hobbes in a higher light when we see, as it were, prophetically figured in his doctrines the later phenomena of the English national life.[39] Reality is often much more paradoxical than any philosophical system, and the actual behaviour of mankind contains more inconsistencies than a thinker could with all his efforts heap together; and of this orthodox but Materialistic England affords us a striking example.

And again, in the sphere of natural science there arose at this time that peculiar combination, which even to this day causes so much surprise to the scholars of the Continent, of a thoroughly Materialistic philosophy with a great respect for the dogmas and customs of religious tradition.

[39] Buckle, Hist. of Civil. in Engl., i. 390, says of Hobbes: "The most dangerous opponent of the clergy in the seventeenth century was certainly Hobbes, the subtlest dialectician of his time; a writer, too, of singular clearness, and, among British metaphysicians, inferior only to Berkeley (?). . . . During his life, and for several years after his death, every man who ventured to think for himself was stigmatised as a Hobbist, or, as it was sometimes called, a Hobbian." These observations are not incorrect, although, unless we take the other side of the matter into account, they present an incorrect picture of Hobbes and his influence. This other side is described by Macaulay, Hist. of Engl., i. 86, pop. ed. (c. ii.)—"Change in the Morals of the Community:" "Thomas Hobbes had, in language more precise and luminous than has ever been employed by any other metaphysical writer, maintained that the will of the prince was the standard of right and wrong, and that every subject ought to be ready to profess Popery, Mahometanism, or Paganism at the royal command. Thousands who were incompetent to appreciate what was really valuable in his speculations eagerly welcomed a theory which, while it exalted the kingly office, relaxed the obligations of morality, and degraded religion into a mere affair of state. Hobbism soon became an almost essential part of the character of the fine gentleman." Further on, however, it is said very truly of this same sort of frivolous gentlemen, that by their means the English High Church came again to wealth and honour. Little as these elegant voluptuaries were inclined to regulate their life according to the precepts of the Church, they were soon just as ready "to fight knee-deep in blood" for her cathedrals and palaces, for every line of her formularies, and every thread of her vestments. In Macaulay's well-known Essay on Bacon occurs the following noteworthy passage as to Hobbes: ". . . His quick eye soon discerned the superior abilities of Thomas Hobbes. It is not probable, however, that he fully appreciated the powers of his disciple, or foresaw the vast influence, both for good or for evil, which that most vigorous and acute of human intellects was destined to exercise on the two succeeding generations."

Two men there are in particular who represent this spirit in the generation after Hobbes—the chemist Robert Boyle, and Sir Isaac Newton.

The modern world sees these two men separated by a great gulf. Boyle is now named only in the history of chemistry, and is, in his significance for the general intellectual life of modern times, almost forgotten; while the name of Newton shines as a star of the first magnitude.[40] Their contemporaries did not see the matter quite in this light, and still less can the more accurate investigations of history be found to affirm this judgment. Newton will have to be less exclusively valued than is usually the case, while Boyle will be found entitled to a prominent place of honour in the history of the sciences. Yet Newton remains the greater man; and even though his explanation of the movements of the heavenly bodies by means of gravitation appears to be a ripe product of time, it was, nevertheless, not a mere chance that this was gathered by a man who united, in so rare a measure, mathematical talent, physical modes of thought, and the enduring capacity for labour. In his leaning to a clear physical and mechanical conception of the course of nature, Boyle entirely agreed with Newton; and Boyle was the older of the two, and must, in regard to the introduction into natural science of Materialistic foundations, be considered as one of the greatest of the pioneers. With him chemistry enters upon a new epoch.[41] The breach with alchemy

[40] More correct is the judgment of Buckle, Hist. Civil. in Engl., i. 367: "After the death of Bacon one of the most distinguished Englishmen was certainly Boyle, who, if compared with his contemporaries, may be said to rank immediately below Newton, though, of course, very inferior to him as an original thinker." To the latter remark we can scarcely subscribe, for Newton's greatness by no means consisted in the originality of his thinking, but in the union of rare mathematical talent with the qualities of character described in the text.

[41] Thus even Gmelin, Gesch. d. Chemie, Gött., 1798, begins the "Zweite Hauptepoche," or *modern* history of chemistry, with "Boyle's Zeitalter (1661–1690)." He rightly observes (ii. 35), that no man contributed so largely "to destroy the authority which alchemy had usurped over so many minds and sciences" as did Boyle. He is treated with greater fulness in Kopp, Gesch. d.

and with Aristotelian notions was completed by Boyle. While these two great students of nature thus naturalised the philosophy of a Gassendi and a Hobbes in the positive sciences, and by their discoveries secured to it a definitive victory, they both, nevertheless, remained Deists in all sincerity, and without any Hobbian reservations. As they remain occupied with the phenomenal world, this was not to be achieved without great weaknesses and inconsistencies; but if they stand lower on this account as philosophers, their influence on the unfolding of the scientific method has thereby been all the healthier. As in so many other points, so in this, Boyle and Newton may be regarded as having set the fashion—that they initiate a rigid severance between the fertile field of experimental inquiry and all those problems which are transcendental, or at least, in the present condition of the sciences, are unapproachable. And hence both exhibit the liveliest interest for questions of method, but only a very slender interest for speculative questions. They are distinctly empiricists; and this must especially be firmly maintained of Newton, if any one is inclined, because of the great generality of his principle of gravitation and his mathematical endowments, to give undue prominence to the deductive side of his intellectual activity.

Robert Boyle (born in 1626) was a son of Viscount Cork, and availed himself of his considerable property in order to live wholly for science. Naturally grave and inclined to melancholy, the doubts as to the Christian faith which were probably excited by his scientific studies were regarded by him very seriously; and as he sought to combat them in his own case by Bible-reading and reflection, he

Chemie, i. 163 ff.: "We see in Boyle the first chemist whose endeavours in chemistry were chiefly directed by the one noble impulse of the investigation of nature;" and then again frequently in the special divisions of the History—especially in the history of the doctrine of affinity, ii. 274 ff.—where, amongst other things, it is said of Boyle, that he from the beginning conceived the problem of the elements in precisely the same sense in which it is now being handled.

felt also the necessity of making others also feel that a reconciliation was possible between faith and knowledge. With this aim he founded public lectures, to which those Essays, amongst others, owe their origin by which Clarke endeavoured to convince the world of the existence of God. Clarke, who had put together a natural religion out of Newton's cosmological notions, entered the lists against every view that would not fit this system, and wrote accordingly not only against Spinoza and Leibniz, but also against Hobbes and Locke, the fathers of English Materialism and Sensationalism. And yet the whole cosmology of the great physicists Boyle and Newton, in whose footsteps he trod, peculiarly interwoven as it was with religious elements, could not have arisen without that same Materialism from which these quite other consequences were drawn.

If we think of the religious and somewhat moody character of Boyle, we must only wonder the more at the straightforwardness of judgment with which he broke through the nets of alchemy. It cannot be denied, moreover, that his scientific theories here and there in chemistry, and especially medicine, still bear traces of the mysticism which at that time was generally dominant in the sphere of those sciences, though at the same time he became the most influential opponent of this mysticism. His 'Chemista Scepticus' (1661), whose very title contains a declaration of war with tradition, is with justice regarded as a turning-point in the history of chemistry. In physics he made most important discoveries, some of which were later attributed to others; yet it must be admitted that his theories often lack the necessary clearness and completeness, so that he does much more in the way of disturbance and preparation than of final accomplishment.[42]

[42] Buckle, Hist. Civil. in Engl., i. 368, attributes specially to Boyle the first exact experiments into the relation between colour and heat, the foundation of the science of hydrostatics, and the original discovery of the law (later called after Mariotte) according to which the density of air varies as its pressure. With regard to hydrostatics, however, Buckle him-

What safely guided him in spite of all defects of his natural character was, above all, his sincere hatred of the phrase-building and pretended knowledge of Scholasticism, and his exclusive confidence in what he saw himself and could show to others as the result of his experiments.[43] He was one of the first members of the 'Royal Society' founded by Charles II., and scarcely any member worked more zealously in the spirit of its foundation. In connection with his experiments he kept a regular *diary*,[44] and never omitted, on finding anything of unusual importance, to lay it before the eyes of his colleagues and other capable persons. This conduct alone would entitle him to a place in the history of modern sciences, which could not have attained their present eminence without adding to experiment the constant control of experiment as well.

self only gives Boyle the first place among Englishmen, and in so doing indirectly admits the greater importance of Pascal (comp., *loc. cit.*, Note 68, where indeed it may be further suggested that the importance of both these men is overrated. According to Dühring, Gesch. d. Princ. der Mechanik, S. 90 ff., Galilei was in this branch also the really originating mind; Pascal only makes an ingenious application of his principles; and as to Boyle, whom Dühring does not even name, in this branch also his chief service is to have clearly exhibited the new principles by experiment). As to the 'Law of Mariotte,' the absolute certainty of Boyle's asserted priority appears to me still somewhat doubtful. Boyle had obviously a great disinclination to hasty generalisations, and, moreover, as it appears, was not fully conscious of the importance of sharply formulated laws. In his principal work on this subject, the "Continuation of New Experiments touching the Spring and Weight of the Air and their Effects," Oxford, 1669, the dependence of pressure upon volume is quite clear; Boyle, in fact, gives methods for the accurate numerical determination of the pressure and quantity of the air remaining in the receiver; at the same time the result is nowhere distinctly drawn out. Thus we find, for instance, Exp. 1, § 6, p. 4 of the Latin edition of Geneva, 1694: "... facta inter varios aeris in phiala constricti expansionis gradus, et respectivas succrescentes Mercurii in tubum elati altitudines comparatione, judicium aliquod ferri possit de vi aeris elastica, prout variis dilatationis gradibus infirmati, *sed observationibus tam curiosis supersedi.*"

[43] Boyle must also be mentioned with praise for the stress which he was, perhaps, the first among the modern physicists to attach to the demand for well-considered and accurately-prepared apparatus.

[44] Comp. especially the essay Experimentorum Nov. Physico-Mech. Continuatio II. (A Continuation of New Experiments, London, 1680), where the days are everywhere given on which the experiments were performed.

This love of experiment, however, is very essentially supported by the Materialistic theory of the essence of natural bodies. In this connection his essay on the "Origin of Forms and Qualities"[45] is of especial interest. He mentions here a long series of opponents of Aristotle, all of whose writings had been useful to him; but he had gained more from Gassendi's small, but extremely valuable compendium of the Philosophy of Epikuros than from all others. Boyle regrets that he had not earlier adopted his theories.[46] The same laudation of the philosophy of Epikuros is found also in other essays of Boyle's, of course in connection with the most vehement protests against its atheistic consequences. We have seen that, in the case of Gassendi, there is some doubt as to the sincerity of this protest; in Boyle's case there can be none. He compares the universe with the ingenious clock of Strasburg Cathedral;[47] to him it is a mighty mechanism, working according to fixed laws; but for this very reason it would, like the clock at Strasburg, have an intelligent originator. Of the elements of Epikureanism, Boyle rejects most distinctly the Empedoklean doctrine of the rise of the homogeneous from the heterogeneous. His cosmology, exactly like that of Newton, bases teleology upon the mechanism itself. Whether in this respect intercourse with his younger contemporary, Newton, who also thought much of Gassendi, worked upon Boyle, or whether conversely Newton rather borrowed from Boyle, we cannot certainly say; it is enough that the two men were so far agreed that they ascribed to God the first origination of motion among the atoms, and that even later

[45] Origin of Forms and Qualities, according to the Corpuscular Philosophy, Oxford, 1664, and often; Latin, Oxford, 1669, and Geneva, 1688. I cite the latter edition.

[46] *Loc. cit.*, Discursus ad Lectorem: "Plus certe commodi e parvo illo sed locupletissimo Gassendi syntagmate philosophiae Epicuri perceperam, modo tempestivius illi me assuevissem."

[47] Comp. Exercitatio IV. de Utilitate Phil. Naturalis, where this subject is treated at great length. "Some Considerations touching the Usefulness of Experimental Natural Philosophy," appeared first at Oxford, 1663–64. In Latin under the title Exercitationes de Utilitate Phil. Nat., Lindaviae, 1692, 4°. (Gmelin, Gesch. d. Chem., ii. 101, mentions a Latin edition, 'London, 1692, 4°.')

they attributed to God certain modifying interferences with the course of nature, but that they sought the ordinary rules of everything that happens in nature in the mechanical laws of the motion of atoms.

The absolute indivisibility which gave the name to the atoms of Demokritos is entirely and readily given up by the moderns. This is due either to the consideration that God who made the atoms must surely be able to divide them, or it is a result of that relativity which was most consciously present in Hobbes: an absolutely smallest is no more admitted even in the elements of the physical world. Boyle troubles himself little on this point. He gives his view the name of 'philosophia corpuscularis,' but is very far, indeed, from adopting the serious modifications made in Atomism by Descartes. He considers matter impenetrable, and believes in the void space combated by Descartes. With regard to this question, he engaged in a somewhat bitter controversy with Hobbes, who explained vacuum to be only a rarer kind of atmosphere.[48] To each smallest particle of matter Boyle ascribes its definite figure, size, and movement; where several of these unite, there must be further taken into account their position in space, and the order of their combination. And then from the varieties of these elements are explained, exactly as in Demokritos and Epikuros, the various impressions made by bodies on the sense organs.[49] But everywhere Boyle declines to enter further into psychological questions: he busies himself only with the world as it was on the eve of the last day but one of creation; that is, so far as we must regard it, merely as a system of corporeal things.[50] The

[48] Comp. the controversial work: Examen Dialogi Physici Domini Hobbes de Natura Aeris, Geneva, 1695.

[49] De Origine Qual. et Form., Geneva, 1688, p. 28 foll. Yet we must observe that Boyle does not make motion an essential characteristic of matter, which remains unchanged in its nature even when at rest. Motion, however, is the 'modus primarius' of matter, and its division into 'corpuscula' is, as with Descartes, a consequence of the motion. Comp. in the same work, p. 44 foll.

[50] Comp. the Tractatus de Ipsa Natura (I can here again only quote the Latin edition of Geneva, 1688),

origin and the destruction of things is with Boyle, as with the ancient Atomists, only the combination and separation of atoms, and in the same light—with a reservation always for the case of miracles[51]—he regards also the processes of organic life.[52] The principle everywhere spread by Descartes, that in death the machine of the body is not merely abandoned by the actuating forces of the soul, but is in its inner particles destroyed, is extended by Boyle with physiological demonstrations, and he shows that numerous phenomena which have been ascribed to the activity of the soul are purely corporeal in their nature.[53] With equal clearness he combats, as one of the leaders of the iatromechanic tendency, the pernicious doctrine of drugs and poisons, to which the effects they have upon the human body —to produce perspiration, for instance, to render deaf, and so on—are attributed as a peculiar force and property; while these effects are really only the result of the contact of the general properties of those matters with the constitution of the organism. So to pounded glass was attributed a special "facultas deleteria," instead of keeping to the simple explanation that the small fragments of glass wound the intestines.[54] In a series of briefer essays, Boyle, whose zeal in these questions of method almost equalled his industry in positive research, attempted to prove the mechanical nature of heat, of magnetism, and of

an essay interesting also in a philosophical regard, sect. i. *ad fin.*, p. 8.

[51] So, for example, in the Tractatus de Ipsa Natura, p. 76, the regularity of nature is praised, in which even apparent disturbances, as, for example, the eclipse of the sun, the inundations of the Nile, and so on, must be regarded as foreseen consequences of the natural laws laid down once for all by the Creator. By the side of these the halting of the sun in the time of Joshua, and the passage of the Israelites through the Red Sea, will be regarded as exceptions, which may occur in rare and important cases, through the special interposition of the Creator.

[52] De Utilitate Phil. Exper., Exerc. v. § 4, Lindaviae, 1692, p. 308: "Corpus enim hominis vivi non saltem concipio tanquam membrorum et liquorum congeriem simplicem, sed tanquam machinam, e partibus certis sibi adunitis consistentem." De Origine Formarum, p. 2: "Corporo iventium curiosas hasce et elaboratas machinas;" and very frequently elsewhere.

[53] De Orig. Form., Gen., 1688, p. 81.

[54] De Orig. Form., p. 8.

electricity, of the interchanges of solid, fluid, or gaseous condition, and so on. Here, of course, he must very often be content, like Epikuros, though with much correcter views, with the supposition of mere possibilities; yet these hypotheses are everywhere sufficient for his immediate object—the banishment of latent qualities and substantial forms, and the introduction of the idea of a really picturable causality running through the whole province of nature.

Less many-sided but more intense was the influence of Newton in the establishment of a mechanical conception of the universe. More sober than Boyle in his theology, and, in fact, suspected by the orthodox of Socinianism, Newton only showed in advanced life, and with failing powers, that leaning to mystical speculations on the Revelation of John,[55] which forms so marked a contrast to his great scientific achievements. His life, until the completion of all the important results of his inquiry, was the quiet existence of a scholar, with full leisure for the development of his wonderful mathematical powers, and the quiet completion of his magnificent and extensive undertakings; then suddenly rewarded for his services by a brilliant position,[56] he continued to live for a long series of years without making any essential addition to the results of his scientific labours. As a boy, he is said to have been remarkable only for mechanical skill. Quiet and delicate, he neither made progress in the school, nor developed any capacity for the business of his father; yet when, in his eighteenth year (1660), he proceeded to Trinity College, Cambridge, he speedily astonished his tutor by the facility and inde-

[55] Newton's "Annotationes in Vaticinia Danielis, Habacuci et Apocalypseos," appeared at London in 1713.

[56] Newton was in 1696 made Master of the Royal Mint, with a salary of £1500 sterling. As early as the year 1693, the loss of a portion of his manuscripts is said to have brought on an illness which acted deleteriously on his intellect. Comp. the biographical sketch given by Littrow in his translation of Whewell's History of the Inductive Sciences, Stuttg., 1840, ii. 163, note. [But see Brewster, Memoirs of Newton, ii. 139 foll. TR.]

pendence with which he appropriated the doctrines of geometry. He belongs to the number of those special mathematical geniuses which the seventeenth century—as though a universal development of European humanity had pressed in that direction—produced in such surprising wealth. A nearer view of his achievements shows that almost everywhere mathematical work, marked alike by genius and application, is the active spirit that inspires everything. As early as 1664, Newton discovered his theory of fluxions, which he published twenty years later, when Leibniz was threatening to rob him of the honour of the discovery. Almost as long a time he carried with him the idea of gravitation; but while fluxions were immediately turned to brilliant account in his calculations, the proof of the unity between the falling motion of bodies and the attraction of the heavenly bodies still needed a mathematical process of which the premisses were for some time unattainable. The calmness, however, with which Newton so long kept both great discoveries to himself, that he might make quiet use of the one, and that the other might ripen, deserves our admiration, and strikingly reminds us of the similar patience and fortitude of his great predecessor Copernicus. But in this also can we discern a great trait of Newton's character, that even after he was quite satisfied as to his discovery of the connection between the law of falling bodies and the elliptic orbits of the planets, and had the full calculations before him, he did not make a separate announcement of it, but incorporated it in his great work the "Principia" (1687), which treated so comprehensively all the mathematical and physical questions connected with gravitation, that Newton could justly give it the proud title of "The Mathematical Principles of Natural Philosophy."

Yet more important was another trait of a similar nature. We have already pointed out that Newton was very far indeed from perceiving in attraction, that 'fundamental force of all matter,' as the discoverer of which

he is now so much praised. Yet it is true that he had made the theory of some such universal attractive force necessary, by laying completely aside his unripe and vague conjectures as to the material cause of attraction, and kept strictly to what he could prove—the mathematical causes of the phenomena, supposing that there was some principle of approximation operating inversely as the square of the distance, let its physical nature be what it may.

We here reach one of the most important turning-points in the whole history of Materialism; and in order to set it in its true light, we must interject a few remarks on the real service rendered by Newton.

We have in our own days so accustomed ourselves to the abstract notion of forces, or rather to a notion hovering in a mystic obscurity between abstraction and concrete comprehension, that we no longer find any difficulty in making one particle of matter act upon another without immediate contact. We may, indeed, imagine that in the proposition, 'No force without matter,' we have uttered something very Materialistic, while all the time we calmly allow particles of matter to act upon each other through void space without any material link. From such ideas the great mathematicians and physicists of the seventeenth century were far removed. They were all in so far still genuine Materialists in the sense of ancient Materialism, that they made immediate contact a condition of influence. The collision of atoms or the attraction by hook-shaped particles, a mere modification of collision, were the type of all Mechanism and the whole movement of science tended towards Mechanism.

In two important points the mathematical formula of the laws had been reached before the physical explanation—the laws of Kepler, and the law of fall, discovered by Galilei; and thus these laws troubled the whole scientific world with the question of the cause—naturally

the physical, the mechanical cause—the cause to be explained from the collision of small particles—of the movement of falling and the motion of the heavenly bodies. In particular, for a long time before and after Newton, the cause of gravitation was a favourite subject of theoretical physics. In this universal sphere of physical speculation, the thought of the essential identity of both forces naturally lay very near; there was indeed, in the axioms of the Atomism of that time, but one single fundamental force in all the phenomena of nature! But this force operated under very various circumstances and shapes, and even then men had begun to be content no more with the bare possibilities of the Epikurean physics. They demanded the construction, the demonstration, the mathematical formula. In the consequent working out of this demand lies Galilei's superiority to Descartes, that of Newton and Huyghens to Hobbes and Boyle, who still found satisfaction in long-spun explanations of how the thing might be possible. In consequence of this effort on the part of Newton, it now again happened, and for the third time, that the mathematical construction went ahead of the physical explanation, and on this occasion the circumstance was to attain a significance unsuspected by Newton himself.

And thus that great generalisation, celebrated by its connection with the story of the fall of the apple,[57] was by no means the most important feature in Newton's discovery. Apart from the influence of the theory we have just mentioned, we have here again sufficient traces to show that the idea of an extension of gravity into space was not far away. Nay, the thought had already occurred

[57] Comp. Whewell's Hist. of the Induct. Sci., ii. 166 foll. From this it appears that so much may be taken from Newton's own communications, according to a tolerably credible tradition coming through Pemberton and Voltaire—that so early as the year 1666, in his twenty-fourth year, as he sat alone in a garden, he reflected upon gravity, and inferred that as gravity still operates at the greatest distances from the centre of the earth of which we have any knowledge, it must therefore *influence the motion of the moon.*

to the ancients that the moon would fall to the earth if it were not kept suspended by the force of its revolution.[58] Newton was acquainted with the composition of forces,[59] and so it lay directly in his path to carry that idea further into the theory—that the moon does actually fall towards the earth. From this falling motion and a forward motion in the direction of the tangent results the orbit of the moon. Regarded as the personal achievement of a great scientific power, the thought here was less important in itself than the criticism brought to bear upon the thought. Newton, as is well known, laid his calculations aside, because the result gave no exact agreement with the motion of the moon.[60] Without wholly giving up his main notions, Newton seems to have sought an explanation of the difference in the operation of some other influence to him unknown; but as he could not complete his demonstration without an exact knowledge of this disturbing force, the whole matter remained for a time in abeyance. Later, as all the world knows, Picard's measurement of the degree (1670), proved that the earth was greater than had hitherto been supposed, and the correction of this factor supplied the desired accuracy to Newton's calculations.

[58] Comp. Dühring, Krit. Gesch. der allg. Principien der Mechanik, Berlin, 1873, p. 175. Ib. p. 180 foll., are noteworthy expressions of Copernicus and Kepler. See moreover in Whewell, Hist. Induct. Sci., ii. 150, the views of Borelli. It must also be observed that Descartes in his Vortical Theory found also the mechanical cause of gravity; so that the idea of the unity of both phenomena was at that time commonly taught. Dühring justly observes that the true problem was to bring the vague idea of an approximation or 'fall' of the heavenly bodies into agreement with Galilei's mathematically definite notion of the fall of terrestrial bodies. These forerunners constantly show how near was the actual synthesis, and we have shown in the text how Atomism must have furthered this synthesis. But Newton's merit lay in this, that he turned the universal thought into a mathematical problem, and, above all, that he effected a brilliant solution of the problem.

[59] In this respect Huyghens especially had done very much by way of preparation, while the first beginnings of the correct theory are here again to be traced to Galilei. Comp. Whewell, Hist. Induct. Sci., ii. 80 foll.; Dühring, p. 163 foll. 188.

[60] Whewell, Hist. Induct. Sci., ii. 168, with which, however, must be compared, as to the story of the beginning of the calculation, Hettner, Literaturg. d. 18 Jahrh., i. 123.

Of great importance, not only for this demonstration, but also especially for its far-reaching consequences, was Newton's assumption that the gravitation of a planet is only the sum of the gravitation of all its individual portions. From this immediately flowed the inference that the terrestrial bodies gravitate towards each other; and further, that even the smallest particles of these masses attract each other. So arose the first foundation of molecular physics. But here the generalisation itself lay so near that it was within immediate reach of every supporter of the Atomistic or corpuscular theory. The effect of the whole could not be other than the sum of the effects of its constituent portions. If we suppose, however, that even Atomism must have made this doctrine impossible, because it bases everything upon the collision of the atoms while it is here a question of attraction, we only confound once more what, since Kant and Voltaire, has been currently called the doctrine of Newton with Newton's real view of these things.

We must here recollect the modification of Atomism made by Hobbes. The 'relativity' of the conception of an atom bore its physical fruits in the more decided distinction between the ether and 'ponderable' matter. There can be bodies, according to Hobbes, which are so small as to be incognisable by our senses, and which in a certain relation may justly be termed 'atoms.' At the same time, others may be supposed to exist by the side of these, which, compared with them, are microscopically small, and by the side of these again others still smaller, and so on to infinity. Physics employed once only the first member of this chain, in order to resolve the original constituents of all bodies into heavy atoms; that is, atoms subject to gravitation; and besides these other particles, infinitely finer atoms, without weight, and yet material, subject to the same laws of collision, of motion, and so on. In these was sought the cause of gravity, and no prominent physicist at that time thought of any other kind of

cause than the mechanism of the motions resulting from impact.

Descartes, then, was by no means alone in deducing, as he did, gravity from the collision of ethereal particles.[61] It has in our time become a custom to condemn severely his daring hypotheses as compared with the demonstrations of a Huyghens or a Newton. We do not remember that these men undoubtedly all most thoroughly agreed with Descartes, through whose school they had passed, in the unitary and mechanical, in short, the picturably mechanical conception of phenomena.

The now prevailing theory of *actio in distans* was regarded simply as absurd; and Newton was no exception. He repeatedly declares in the course of his great work that, for methodological reasons, he disregards the unknown physical causes of gravity, but does not doubt their existence. So he observes, for example, that he regards the centripetal forces as attractions, although, perhaps, if we will employ the language of physics, they might more accurately be called impulses (*impulsus*).[62] Indeed, when the

[61] Princip. iv.

[62] Phil. Nat. Princ. Math., i. 11 *ad init.*: a passage of quite the same tendency may be found towards the conclusion of this section. (In the edition Amstelodami, 1714, pp. 147 and 172; orig. ed. 1687, pp. 162 and 191.) In the latter passage Newton calls the hypothetical matter, which, by its impulsion, produces gravitation, 'spiritus.' There are here, of course, very different possibilities mentioned, amongst them the actual tendency of bodies towards each other, and even the action of an incorporeal medium; but the special object of the passage is to show the unconditional and universal validity of the mathematical developments, be the physical cause *what it may*. Where Newton's favourite idea lies betrays itself clearly enough at the conclusion of the whole work. We will here add the whole of the last paragraph:—"Adjicere jam liceret nonnulla de spiritu quodam subtilissimo corpora crassa pervadente et in iisdem latente, cuius vi et actionibus particulae corporum ad minimas distantias se mutuo attrahunt, et contiguae factae cohaerent; et corpora electrica agunt ad distantias majores, tam repellendo, quam attrahendo corpuscula vicina; et lux emittitur, reflectitur, refringitur, inflectitur et corpora calefacit; et sensatio omnis excitatur, et membra animalium ad voluntatem moventur, vibrationibus scilicit huius spiritus per solida nervorum capillamenta ab externis sensuum organis ad cerebrum et a cerebro in musculos propagatis. Sed haec paucis exponi non possunt; neque adest sufficiens copia experimentorum, quibus leges actionum huius spiritus accurate determinari et monstrari debent."

zeal of his followers went so far as to declare gravity to be a fundamental force of matter (by which all further mechanical explanation from the collision of imponderable particles was excluded), Newton felt himself obliged, in the year 1717, in the preface to the second edition of his "Optics," to protest expressly against this view.[63]

Even before the appearance of this last declaration of Newton's, his great predecessor and contemporary, Huyghens, declared he could not believe that Newton regarded gravity as an essential property of matter. Huyghens, however, in the first chapter of his Essay on Light, roundly declared that in the true philosophy the cause of all natural effects must be explained '*per rationes mechanicas.*' We see now how these views hang together, and can understand how even men like Leibniz and Johann Bernouilli were offended by the new principle; nay, that the latter did not desist from an attempt to see whether a mathematical construction could not be deduced from the principles of Descartes which should be also sufficient for the facts.[64]

All these men are unwilling to separate mathematics from physics, and they were unable to comprehend the theory of Newton as a *physical* theory.

The same difficulty occurred here which had opposed the doctrine of Copernicus, and yet the cases were in a very essential point unlike. In each case a prejudice of the senses was to be overcome; but in the case of the earth's revolution, we could, at least in the last resort, bring the laws themselves to our aid, in order to be convinced that what we feel is only relative and not absolute motion. But in the other case it was a question of making

[63] Comp. Ueberweg, Hist. Phil., iii. 3 Aufl. p. 102, E. T. ii. 89, 90.

[64] Whewell, Hist. Ind. Sci., ii. 149. And yet men like Huyghens, Bernouilli, and Leibniz were then almost the only men on the Continent who could estimate at their full value the achievements of Newton, and especially in mathematics. Compare Littrow's interesting note in his translation (ii. S. 141, ff.), especially with regard to the opposition with which Newton's theory of gravitation was at first received in England.

one's own a physical conception, which contradicted, and still contradicts to-day, the picturable principle of all physics.[65] Newton himself, as we have seen, shared this view, but he clearly separated the mathematical construction which he could supply from the physical which he could not find, and so he became, against his will, the founder of a new cosmical theory, containing obvious inconsistency in its first elements. His '*hypotheses non fingo*' threw down the old foundation of theoretical Materialism, in the same instant in which it appeared predestined to celebrate its loftiest triumphs.[66]

We have already pointed out that Newton's peculiar service is, above all, to be sought in his completion of the mathematical proof. The thought, indeed, that the laws of Kepler are to be explained by central force, which is inversely proportional to the square of the distance, had occurred simultaneously to several English mathematicians.[67] Newton, however, was not only the first to reach

[65] We can, therefore, very well understand that the attempts to explain gravity from picturable physical principles constantly recur, as, for instance, in Lesage, for whose attempt at a solution (1764) see Ueberweg's Hist. Phil., iii., 3 Aufl., S. 102, E. T. ii. 89, 90. Recently a similar attempt has been made by H. Schramm, Die Allg. Bewegung der Materie als Grundursache aller Naturerscheinungen, Wien, 1872. It is an illustration of the force of habit, that such attempts are now-a-days very coldly received by specialists. They have once for all accepted the theory of *actio in distans*, and feel no further need to substitute anything for it. The remark of Hagenbach, Zielpunkte der Physik. Wissensch., S. 21, that similar attempts are still ever being made to explain attraction by what are supposed to be "simpler" principles, is a characteristic misunderstanding. It is a question, in such attempts, not of simplicity, but of picturableness as an element of intelligibility.

[66] The expression 'hypotheses non fingo' is found at the conclusion of the work, a few lines before the passage quoted above (Note 62), together with the explanation: "Quidquid ex phaenomenis non deducitur, hypothesis vocanda est; et hypotheses seu metaphysicae, seu physicae seu qualitatum occultarum, seu mechanicae, in philosophia experimentali locum non habent." The true method of experimental science Newton declares to be—that the principles ("propositiones") are gathered from phenomena and generalised by means of induction. In these far from correct statements, as well as in the four 'Rules for the Investigation of Nature,' laid down at the beginning of the third book, there is expressed conscious opposition to Descartes, against whom Newton was very strongly prejudiced. Compare the story told by Voltaire in Whewell, Hist. Ind. Sci., ii. 148.

[67] Newton himself recognised that Christopher Wren and Hooke (of whom the latter indeed would claim the priority in the whole proof of

the goal, but he accomplished the task with such masterly comprehensiveness and certainty, and shed in its accomplishment such a fulness of light over all parts of mechanics and physics, that the "Principia" would still be an admirable book, even though the main principle of the new doctrine had not so brilliantly established itself. His example appears to have so dazzled the English mathematicians and physicists, that they lost their independence, and for a long time left the lead in the mechanical sciences to the Germans and the French.[68]

From the triumph of this purely mathematical achievement there was curiously developed a new physics. Let us carefully observe that a purely mathematical connection between two phenomena, such as the fall of bodies and the motion of the moon, could only lead to that great generalisation in so far as there was presupposed a common and everywhere operative material cause of the phenomena. The course of history has eliminated this unknown material cause, and has placed the mathematical law itself in the rank of physical causes. The collision of the atoms shifted into an idea of unity, which as such rules the world without any material mediation. What Newton held to be so great an absurdity that no philosophic thinker could light upon it,[69] is prized by posterity as Newton's great discovery of the harmony of the universe! and, rightly understood, it is his discovery, for this harmony is one and the same, whether it is brought about by a subtle matter, penetrating everywhere and obeying the laws of collision, or whether the particles of

gravitation) had discovered the relation of the inverse square of the distance independently of him. Halley, who, in contrast to Hooke, was one of the most unenvious of Newton's admirers, had even conceived the happy thought that the attraction must necessarily lessen in that proportion, because the spherical surface over which the radiating force spread itself became in the same proportion ever greater. Comp. Whewell, Hist. Induct. Sci., ii. 156–158.

[68] Comp. Snell, Newton und die Mechan. Naturwissenschaft, Leipzig, 1858, p. 65.

[69] So Newton expressed himself in a letter to Bentley of the year 1693. Comp. Hagenbach, Zielpunkte der Physikal. Wissensch. Leipzig, 1871, p. 21.

matter regulate their movements in accordance with the mathematical law without any material intervention. If in this later case we wish to get rid of the absurdity, we must get rid of the idea that everything acts where it is not; that is, the whole conception of the mutual influence of the atoms falls away as an anthropomorphism, and even the conception of causality must assume an abstracter shape.

The English mathematician Cotes, who, in the preface to the second edition of the "Principia," which he edited in 1713, made gravity an essential property of all matter, accompanied this idea, which has since dominated science, with a philippic against the Materialists who make everything arise of necessity and not through the will of the Creator. He regards it as an especial merit of the Newtonian system that it makes everything arise out of the most unfettered purpose of God. The laws of nature, in the opinion of Cotes, exhibit many traces of the wisest purpose, but none of necessity.

Half a century had not passed away when Kant in his "Allgemeine Naturgeschichte u. Theorie des Himmels" (1755), combined with the popularisation of the Newtonian theory that bold extension of it which we now commonly designate the Kant-Laplace hypothesis. In the preface to this work, Kant admits that his theory bears a considerable likeness to those of Epikuros, Leukippos, and Demokritos.[70] No one thought any longer of seeing in the universal attraction of material particles anything but a mechanical principle, and in our day the Materialists prefer to assign to the Newtonian cosmology of the universe the rôle that, until the eighteenth century, was always assigned to the Atomism of the ancients. It is the theory of the necessary origin of all things in virtue of a property that is inherent in all matter as such.

In their influence upon the general movement of thought, the religious tendency of Newton and Boyle soon and easily separated itself from the scientific significance of

[70] Kant's Werke, Hg. v. Hartenstein, Leipzig, 1867, i. 216.

their achievements. Yet upon England itself it appears to have exercised some effect; indeed, this unique mixture of Materialism and religiosity may be regarded as a peculiar product of English soil. Similarly the conservative feature in their character may in some measure be connected with the time and the circumstances in which they lived and had their influence. Buckle has made the interesting remark, that the revolutionary period, and especially the great political and social storms of the first revolution in England, exercised a great and penetrating influence upon the sentiments of the literary class, chiefly through the shattering of authorities and the awakening of the sceptical spirit.[71] He considers also Boyle's scepticism in chemistry to be a fruit of the spirit of the age. Under Charles the Second especially the progress of the revolution, at least in one respect, went uninterruptedly forward—the spreading of the spirit of experimental inquiry. On the other hand, we must, of course, also remark, that the flower of Boyle's and Newton's inquiries falls in the comparatively quiet and reactionary period between the two revolutionary storms, and that they personally concerned themselves little with politics.[72] The political struggles exercised a very different influence on the life of the man who, after Bacon and Hobbes, must be regarded as the most prominent continuator of the philosophical movement in England, and whose influence on the Continent was more important than that of both his predecessors.

[71] Hist. of Civil., ii. 70 foll. As to the case of the conversion of Sir Thomas Browne (*loc. cit.*, 72 foll), we may adduce the rumour mentioned in Morhof's Polyhistor, that he wrote the "Religio Medici" in order to free himself from the suspicion of atheism. But if this instance was not so much in point as Buckle seems to think, yet the general view which it is adduced to illustrate is undoubtedly correct.

[72] In Whewell, Hist. Induct. Sci., ii. 153 foll., there is a sketch of the disturbance exercised by the revolutionary storms in the life and activity of the chief English mathematicians and scientific men. Several of these joined with Boyle in 1645 to form the 'Invisible College,' the first germ of the Royal Society founded later by Charles the Second.

John Locke (born in 1632), the head of the English Sensationalists, stands also in manifold relation to the history of Materialism. Standing in point of age between Boyle and Newton, his chief activity only appeared after Newton's had closed in the principal objects, and his literary activity was strongly and decisively influenced by the events which introduced and accompanied the second English revolution. In the case of Locke, as in that of Hobbes, his entrance into one of the first English families became the foundation of his later worldly position. Like Hobbes, he was initiated into philosophy at the University of Oxford, but the contempt of Scholastic training, which was only late established in the case of Hobbes, was with him already in the student period. Descartes, whose acquaintance he made at this time, exercised some influence on him, but he speedily turned to medicine, and so his first position was that of medical adviser in the house of Lord Ashley, afterwards Lord Shaftesbury. In his ideas of medicine, he agreed admirably with the celebrated physician Sydenham, who at that time was from England paving the way for a reform of the degenerate art of healing similar to that attempted later by Boerhave from the Netherlands; and thus early he proves himself to be a man of healthy common sense, equally averse from superstition and metaphysics. Locke was also an enthusiastic student of natural science. And so we find in Boyle's works a diary kept by Locke for many years of atmospheric observations with the barometer, thermometer, and hygrometer. But Lord Ashley turned his attention to political and religious questions, to which he then devoted an interest as lasting as it was intense.

While Hobbes stood on the side of absolutism, Locke belonged to the liberal movement—nay, he was, and perhaps not unjustly, regarded as the father of modern constitutionalism. The axiom of the separation of the legislative and administrative power, which in the time of Locke was actually accomplished in England, he was the first

to develop as a definite theory.[73] With his friend and protector Lord Shaftesbury, Locke, after occupying for a short time a post at the Board of Trade, was driven into the vortex of opposition. For years he lived on the Continent, partly in voluntary banishment, partly from the actual persecution of the Government. In this school was hardened his zeal for toleration and civil freedom. The offer of powerful friends who would have procured him pardon from the court, he declined with an appeal to his innocence, and it was only the Revolution of 1688 that restored him to his fatherland.

At the very outset of his political activity, Locke marked out in 1669 a constitution for the State of Carolina in North America, which turned out badly, however, and has little agreement with his later and ripened Liberalism. The more important, however, on the other hand, were his Essays on the Coinage, which contained but a defective recognition of the interests of the national creditors; but in the discussion developed so many luminous observations, that he must be regarded as an important forerunner of English political economy.[74]

[73] Comp. Mohl, Gesch. u. Liter. der Staatswissench., i. 231 foll.

[74] On the controversy between Locke and the finance minister Lowndes, comp. Karl Marx, Zur Kritik der Polit. Oekonomie, Berlin, 1859, 1 Heft, p. 53 foll. Lowndes, on occasion of recoinage of the bad and depreciated pieces, wished to make the shilling lighter than the earlier legal requirement. Locke insisted that the coinage should be in accordance with the legal standard, which had, however, long ceased to be observed in practice. The result followed that debts (and among them notably the national obligations) which had been contracted in light shillings had to be repaid in heavy ones. Lowndes based his substantially more correct view upon bad arguments which were victoriously refuted by Locke, with a precise indication of the latter's relation to the different parties. Marx says: "John Locke, who represented the new 'bourgeoisie' in all its forms, the industrial interest against the working-class and the paupers, the commercial interest against the old-fashioned lending class, the monied aristocracy against the national debtors; and, in fact, in one of his books proved the common sense of the *bourgeois* to be the norm of human intelligence, took up the gauntlet also against Lowndes. Locke conquered, and money borrowed at ten or fourteen shillings the guinea was repaid in guineas of twenty shillings."

For the rest it is further asserted by Marx (well known to be the most learned living historian of political economy), that Locke's most valuable

We have here, then, yet another of those English philosophers who, in the midst of active life, and furnished with great knowledge of the world, devoted themselves to the solution of abstract questions. Locke projected his famous work, "Essay concerning Human Understanding," so early as 1670, but it was not till twenty years later that it was published in its complete form. Although the absence of the author from his native country may have had something to do with this, there is no doubt that Locke was constantly busied with the ideas once conceived, and that he sought to give more and more completeness to his work.

Just as it was a very ordinary circumstance—an aimless controversy between some friends—that led him to entertain the question of the origin and limits of human knowledge,[75] so he employs everywhere in his investigations ordinary and yet forcible points of view. We have still in these days in Germany so called philosophers who, with a kind of metaphysical bungling, write huge treatises on the formation of ideas, with no pretension whatever, of course, to "exact observation by means of the inner sense," without also the thought ever occurring to them that there are nurseries—it may be in their own houses—in which we may observe at least the outward indications of the formation of concepts with our own eyes and ears. This sort of weed does not grow in England. Locke betakes himself in his polemic against innate ideas to children and idiots. All the uneducated have no suspicion of our abstract propositions, and can they nevertheless be innate? The objection that these ideas are actually in the mind, although it is not conscious of it, he characterises as irrational. For what we know is exactly that which is in the

contributions to the theory of money are but a beating out of what had been already developed by Petty in a treatise of the date of 1682. Comp. Marx, Das Kapital, Kritik der Polit. Oekon., Hamburg, 1867, i. S. 60.

[75] See the account in the 'Epistle to the Reader,' prefixed to the 'Essay concerning Human Understanding;' see for this also Hettner, Literaturg. d. 18 Jahrh., i. S. 150.

mind. Nor can we say that the general propositions are first known to consciousness when we begin to use our understanding. On the contrary, the knowledge of the particular is prior. Long before the child recognises the logical law of contradiction it knows that sweet is not bitter.

Locke shows that the converse is the true way in which the understanding is formed. We do not first have certain general propositions in our consciousness, which receive their special content later through our experience; but experience, sensible experience, is the first source of our knowledge. The senses first give us certain simple ideas, an expression which is very common in Locke, and means very much what the Herbartians call 'Vorstellungen.' Such simple ideas are sounds, colours, the sense of resistance to touch, the ideas of extension and of motion. If the senses have frequently given us such simple ideas, there results a combination of what is like amongst them, and this is the way in which abstract ideas are formed. To sensation comes the internal sense of reflection, and these are "the only windows" by which the darkness of the uneducated understanding is illuminated. The ideas of substances, of changing properties, and of relations, are compound ideas. We know at bottom nothing of substances except their attributes, which are taken from simple sense-impressions, such as sounds, colours, and so on. Only through these attributes showing themselves frequently in a certain connection do we succeed in forming the compound idea of a substance which underlies the changing phenomena. Even feelings and emotions spring from the repetition and manifold combination of the simple sensations which the senses convey to us.

It was only then that the old Aristotelian, or presumably Aristotelian, propositions that the soul is originally a '*tabula rasa*,' and that nothing can be in the mind which was not previously in the senses, attained that importance

which we now commonly assign to them: in this sense they may be attributed to Locke.[35]

Whenever the human mind, which occupies a merely receptive attitude towards sense-impressions, and even the formation of complex ideas, proceeds to fix by means of words the abstract ideas it has acquired, and to connect these words arbitrarily with thoughts, it enters upon the path where there is no longer the certainty of natural experience. The further man gets from the sensible, the more liable is he to error; and it is nowhere so common as in language. So soon as the words are treated as adequate pictures of things, or are confounded with real picturable things, while they are really only arbitrary signs for certain ideas which must be used with great care, the field is opened to innumerable errors. Locke's criticism of the understanding turns into a criticism of language, which in its main idea is probably of higher value than any other portion of the system. In fact, the way was paved by Locke to the important distinction of the purely logical from the psychologico-historical element of speech; but, apart from

[76] The image of the "tabula, in qua nihil est *actu* scriptum" occurs in Aristotle, De Anima, iii. c. 4. In Locke, book ii. c. i. § 2, the mind is regarded simply as "white paper," but without any reference to the Aristotelian antithesis of potentiality and actuality. This antithesis is, however, just in this case of great importance, since the Aristotelian 'potentiality' of receiving all kinds of characters is conceived as a real property of the tablet, not as mere conceivability or absence of hindering circumstances. Aristotle therefore stands closer to those who, like Liebniz, and, in a deeper sense, Kant, do not, indeed, suppose that these are complete ideas in the soul, but that the *conditions* are present from which, upon contact with the external world, exactly that phenomenon will result which we call *to have ideas*, and with those peculiarities that constitute the nature of human ideas. This point, the subjective antecedent conditions of ideation as foundation of our whole phenomenal world, Locke did not sufficiently notice. With regard to the proposition, "Nihil est in intellectu, quod non fuerit in sensu" (to which Liebniz, in his polemic against Locke, made the addition "nisi ipse intellectus;" comp. Ueberweg, Hist. Phil., iii. 3 Aufl. S. 127, E. T. ii. 112), we should bear in mind what Aristotle says, De Anima, iii. c. vii. viii. Even Thomas Aquinas taught that actual thinking in man is first brought about by the co-operation of the intellectus with a sensuous phantasma. But potentially the mind already includes within itself all that can be thought. This important point loses all its significance in Locke.

the previous labours of the philologists, had as yet scarcely been demanded as essential. And yet by far the majority of the conclusions which are generally applied in the philosophical sciences are logical fallacies, because of the constant confusion of notion and word. And so the old Materialistic view of the merely conventional force of words turned with Locke into the effort to *make* words merely conventional, because only when thus limited have they a fixed sense. In the last book Locke examines the nature of truth and of our cognitive faculties. Truth is the correct combination of signs (words, *e.g.*) forming a judgment. Truth in mere words can be nothing but a chimera. The syllogism has little use, for our thought always mediately or immediately directs itself to particulars. "Revelation" can give us no simple idea, and therefore cannot really extend our knowledge. Belief and thought are so related that the latter alone is decisive, so far as it goes; yet there are certain things which Locke finally admits transcend the reason, and are therefore objects of belief. Strength of conviction, however, is no sign of truth; even of revelation the reason must judge, and enthusiasm is no evidence of the divine origin of a doctrine.

Great influence was, moreover, exercised by Locke's "Letter on Toleration" (1685–92), "Thoughts on Education" (1693), the "Essay on Government" (1689), and the "Reasonableness of Christianity" (1695); but only a portion of these writings belong to the history of Materialism. With certain glance Locke had discovered the point in which the hereditary medieval institutions were rotten—the confusion of politics and of religion, and the diversion of political force to the maintenance or suppression of doctrines and opinions.[77] It is obvious that if the object at

[77] Also as regards the idea that the State should afford the liberty of expression in religious opinion, Locke had been forestalled by others, among whom Thomas More (in the Utopia, 1516) and Spinoza must be specially mentioned. Here again, then, his importance (comp. Note 74) is not so much due to originality as to the timely and fruitful carrying out of ideas which corresponded to the altered conditions of society. As to

which Locke aimed were once attained—if Church and State were separated and universal toleration in matters of doctrine introduced—that the position of Materialism would be also necessarily changed. The earlier hide-and-seek fashion in which its doctrines were expounded, and which lasted till late in the eighteenth century, had gradually to disappear. The simple cloak of anonymousness was longest retained; but even this was discarded, as at first the Netherlands, and later the country of Frederick the Great, offered a safe asylum to the freethinkers, until at length the French Revolution gave the death-blow to the old system.

Among the English freethinkers who took up and carried further the ideas of Locke, none stands nearer to Materialism than John Toland, who was perhaps the first to conceive the notion of basing a new religious cultus upon a purely Naturalistic, if not Materialistic, doctrine. In his treatise, "Clidophorus," that is, the 'key-bearer,' he refers to the practice of the ancient philosophers to set forth an exoteric and an esoteric teaching, of which the former was intended for the general public, but the latter only for the circle of initiated disciples. Referring to this, he interjects, in the thirteenth chapter of the treatise, the following remarks:—

"I have more than once hinted that *the External and Internal Doctrine* are as much now in use as ever; tho' the distinction is not so openly and professedly approv'd as among the Antients. This puts me in mind of what I was told by a near relation to the old Lord SHAFTESBURY. The latter, conferring one day with Major WILDMAN about the many sects of Religion in the world, they came to this conclusion at last: that notwithstanding those infinite divisions caus'd by the interest of the priests and the ignorance of the people, ALL WISE MEN ARE OF THE SAME RELIGION; whereupon a Lady in the room, who seem'd to

the exceptions he makes to the rule of toleration with reference to Atheists and Catholics, comp. Hettner, i. 159 ff.

mind her needle more than their discourse, demanded with some concern what that Religion was? To whom the Lord SHAFTESBURY strait reply'd, MADAM, WISE MEN NEVER TELL." Toland approves this proceeding, but thinks that he can suggest a way in which universal truth-speaking may be made possible:—"*Let all men freely speak what they think, without being ever branded or punish'd but for wicked practises, and leaving their speculative opinions to be confuted or approv'd by whoever pleases; then you are sure to hear the whole truth, and till then but very scantily, or obscurely, if at all.*"

Toland himself has frankly enough expressed his esoteric doctrine in the anonymous "Pantheistikon" (Cosmopolis, 1720). He demands in this treatise the entire laying aside of revelations and of popular beliefs, and the construction of a new religion which agrees with philosophy. His God is the universe; everything is born from the all, and returns into the all. His cultus is that of truth, liberty, and health, the three things most highly prized by the wise man. His saints and fathers are the master-spirits and most excellent authors of all times, especially of classical antiquity; but even they form no authority to chain 'the free spirit of mankind.' The president cries in the Sokratic liturgy, 'Swear by no master's word!' and the answer comes back to him from the congregation, 'Not even by the word of Sokrates!'[78]

[78] For fuller information as to Toland, especially as to his first work, which connects itself closely with Locke, "Christianity not Mysterious," 1696, see in Hettner, Literaturg. d. 18 Jahrh., i. S. 170 ff. 'The most striking features' of the 'Sokratic Liturgy' are given by Hettner in the same place, S. 180 ff. Hettner has also quite rightly referred to the connection of English Deism with Freemasonry. Here, too, may be indicated the special point, that Toland treats his cultus of the 'Pantheists' distinctly in the sense of the esoteric doctrine of philosophy, as the cultus of a secret society of illuminati. The initiated may at the same time give way to a certain extent to the crude ideas of the people, which, as contrasted with them, consists of children who have not yet attained the years of discretion, if only they succeed, through their influence in the State and in society, in rendering fanaticism harmless. These thoughts are expressed chiefly in the appendix, "De Duplici Pantheistarum Philosophia." The following striking passage from the

In the "Pantheistikon," however, Toland expresses his views with so much generality, that his Materialism does not appear decided. What he takes from Cicero (Acad. Quaest., i. c. 6, 7) as to the being of nature, the unity of force and matter (*vis* and *materia*), is, in fact, rather Pantheistic than Materialistic; on the other hand, we find a Materialistic theory of nature laid down in two letters to a Spinozist, which are appended to the "Letters to Serena" (London, 1704). The lady who thus gives her name to the letters is Sophie Charlotte, Queen of Prussia, whose friendship with Leibniz is well known, and who had also graciously received Toland (who spent many years in Germany), and listened with interest to his views. The three first letters of the collection, which were actually addressed to Serena, are general in their nature; yet Toland expressly observes in the preface that he has corresponded with the noble lady on other and much more interesting subjects, but that he possesses no fair copy of these letters, and therefore adds the two other letters. The first of these contains a refutation of Spinoza, based on the impossibility of explaining from the Spinozistic system the motion and internal variety of the world and its constituent parts. The second letter handles the kernel of the whole question of Materialism. It might be called 'Kraft and Stoff,' if it were not that we must consider the title it actually bears, 'Motion Essential to Matter,' to be even clearer.

We have repeatedly seen how deeply the old notion of

second chapter of this appendix ("Pantheistikon," Cosmopolis, 1720, p. 79 ff.) may here find a place:—

"At cum superstitio semper eadem sit vigore, etsi rigore aliquando diversa; cumque nemo sapiens eam penitus ex omnium animis evellere, quod nullo facto fieri potest, incassum tentaverit: faciet tamen pro viribus, quod unice faciendum restat; ut dentibus evulsis et resectis unguibus, non ad lubitum quaquaversum noceat hoc monstrorum omnium pessimum ac perniciosissimum. Viris principibus et politicis, hac animi dispositione imbutis, acceptum referri debet, quidquid est ubivis hodie *religiosae libertatis*, in maximum literarum, commerciorum et civilis concordiae emolumentum. Superstitiosis aut simulatis superum cultoribus, larvatis dico hominibus aut meticulose piis, debentur dissidia, secessiones, mulctae, rapinae, stigmata, incarcerationes, exilia et mortes."

matter as a dead, stark, and passive substance enters into all metaphysical questions. In the face of this notion Materialism is simply true. We are here concerned not with different equally well-founded standpoints, but with different degrees of scientific knowledge. Although the Materialistic view of the world may need a further explanation, it will, at all events, never lead us backwards. When Toland wrote his letters, men's minds had for more than half a century been used to the atomism of Gassendi; the undulation theory of Huyghens had afforded a deep insight into the life of the smallest particles; and if it was only seventy years later, through Priestley's discovery of oxygen, that the first link was fashioned in the infinite chain of chemical action, nevertheless the life of matter down to its smallest particles was definitely determined from experience. Newton, who is always mentioned by Toland with the utmost respect, had, of course, by his theory of the primitive collision, and the weakness with which he demanded the occasional interference of the Creator in the course of his world-machine, left matter in possession of its passivity; but the thought of attraction as a property of all matter speedily freed itself from the idle patchwork which the theologically narrow ideas of Newton had connected with it. The world of gravitation lived in itself; and it is no wonder that the freethinkers of the eighteenth century, with Voltaire at their head, regarded themselves as the Newtonian natural philosophers.

Toland goes on, relying upon indications of Newton's, to maintain that no body is in absolute rest;[79] nay, with an ingenious application of the old English Nominalism, which helped this people to make so great an advance in the philosophy of nature, he explains activity and pas

[79] Letters to Serena, London, 1704, p. 201. The passages of the "Principia" there cited (p. 7 and p. 162 of the 1st ed.), are to be found in the note to the preliminary explanations, and at the beginning of § 11 of the first book: "Fieri etenim potest ut nullum revera quiescat corpus," and p. 162: "Hactenus exposui motus corporum attractorum ad centrum immobile, quale tamen vix extat in rerum natura."

sivity, rest and motion, to be purely relative notions, while the eternal internal activity of matter operates with equal force when, in counteraction to other forces, it maintains a body in comparative rest, and when it lends it an accelerated motion.

"Every motion is as well a passion in respect of the body that gave it the last determination, as it is an action compared to the body that it determines next; but the turning of these and such words from a relative to an absolute signification has occasioned most of the errors and disputes on this subject."[80] Unhistorical, like the majority of his contemporaries, Toland does not observe that the absolute notions are naturally developed, while the relative notions, on the contrary, are a product of culture and of science. "These determinations of motion in the parts of solid extended matter are what we call the phenomena of nature, and to which we give names or ascribe uses, perfection or imperfection, according as they affect our senses, and cause pain or pleasure to our bodies, contribute to our preservation or destruction; but we do not always denominate them from their real causes or ways of producing one another, as the elasticity, hardness, softness, fluidity, quantity, figures, and relations of particular bodies. On the contrary, we frequently attribute many determinations of motion to no cause at all, as the spontaneous motion of animals; for, however these motions may be accompanied by thought, yet, considered as motions, they have their physical causes, such as a dog's running after a hare, the bulk of the external object acting by its whole force of impulse or attraction on the nerves, which are so disposed with the muscles, joints, and other parts as to produce various motions in the animal machine. And whoever understands in any measure the action of bodies on one another by their immediate contact, or by the imperceptible particles that continually flow from them, and to this knowledge joins that of mechanics,

[80] Letters to Serena, p. 200 [not 100, as in the German edition.—Tr.]

hydrostatics, and anatomy, will be convinced that all the motions of sitting, standing, lying, rising, running, walking, and such others, have their proper, external, material, and proportionable determinations."[81] Greater clearness cannot be desired. Toland obviously regards thought as a phenomenon which is an inherent accompaniment of the material movements in the nervous system, much as the light which results from a galvanic current. The voluntary motions are motions of matter, which arise in accordance with the same laws that govern all other motions, only in a more complicated apparatus.

When Toland accordingly goes on to intrench himself behind a much more general expression of Newton's, and at length expressly guards against the idea that his system makes the theory of a controlling reason superfluous, we cannot help remembering his distinction between the exoteric and esoteric teaching. The anonymously published "Pantheistikon," which may on that account be very well regarded as esoteric, reverences no transcendental world-spirit of any kind, but only the universe in immutable unity of spirit and matter. Yet so much we may, at any rate, collect from the conclusion of the remarkable letter—that Toland does not, like the ancient Materialists, consider this present world as a merely casual result preceded by innumerable imperfect experiments, but assumes a magnificent purposefulness immutably inherent in the universe.[82]

[81] Letters to Serena, pp. 231-233.

[82] Compare Letters to Serena, pp. 234-237. Toland here employs, with regard to the Empedoklean principle of evolution, and as far as we can see quite seriously, the illustration that we can just as little explain the development of a flower or a fly out of the in itself objectless concurrence of atoms, as the development of an "Aeneid" or an "Iliad" out of the myriad combinations of the single letters. The argument is false, but plausible; it belongs to the same point of the calculation of probabilities on the total misunderstanding of which von Hartmann has based his 'Philosophy of the Unconscious.' Toland, however, in other respects, by no means subscribes to the Epikurean theory, even in the most important points. He rejected the atoms and void space, and with it also the notion of any space at all existing independently of matter.

Toland is one of those benevolent beings who exhibit to us a great character in the complete harmony of all the sides of human existence. After an eventful life he enjoyed in cheerful calmness of soul the secluded stillness of country life. When scarcely over fifty years of age he was attacked by a disease, which he endured with the calmness of a philosopher. A few days before his death he prepared his epitaph; he took leave of his friends, and fell asleep in untroubled peace of spirit.*

* [The English reader may be referred also to Mr. Leslie Stephen's recent "History of English Thought in the Eighteenth Century" (Lond., 1876, 2 vols.), where indeed Toland seems to be somewhat under-rated. —Tr.]

First Book

Continued.

HISTORY OF MATERIALISM UNTIL KANT.

FOURTH SECTION.

EIGHTEENTH CENTURY MATERIALISM.

CHAPTER I.

THE INFLUENCE OF ENGLISH MATERIALISM IN FRANCE AND GERMANY.

ALTHOUGH modern Materialism appeared as a system first in France, yet England was the classic land of materialistic modes of thought. Here the ground had already been prepared by Roger Bacon and Occam; Bacon of Verulam, who lacked almost nothing but a little more consistency and clearness in order to be a Materialist, was wholly the man of his age and nation, and Hobbes, the most consequent of the modern Materialists, is at least as much indebted to English tradition as to the example and precedence of Gassendi. It is true, indeed, that by Newton and Boyle the material world-machine was again provided with a spiritual constructor; but the mechanical and materialistic theory of nature only rooted itself the more firmly the more one could pacify religion by appealing to the Divine inventor of the great machine. This peculiar combination of faith and Materialism[1] has kept its ground in England down to our own days. We need mention only the pious sectarian Faraday, who essentially owes his great

[1] Compare what has been said above, vol. i. p. 296 foll. We find as early as Hartley the results of the conservative tendency introduced by Hobbes.

discoveries to the concrete liveliness with which he conceived natural events, and the consistency with which he asserted the mechanical principle through every branch of Physics and Chemistry.

Even in the middle of the eighteenth century, when the French Materialists caused so much perturbation on the Continent, England had Materialists of its own.

The physician David Hartley published in the year 1749 a work in two volumes which made a great sensation. It bore the singular title, "Observations on Man, his Frame, his Duty, and *his Expectations*."[2] By these were meant chiefly our 'expectations' in the life to come. The book contains a physiological, or one might even call it a psychological section, and a theological section; and it was the latter that caused most excitement. Hartley was a master of theological questions. The son of a clergyman, he would have devoted himself to this profession, but that doubts as to the Thirty-nine Articles drove him into medicine. He did not favour 'Hobbism' in religious matters therefore, or such doubts would scarcely have been entertained. In his work we see where he hesitated; he defends the miracles, asserts the authority of the Bible, deals at great length with the life after death; but he doubts the eternity of punishment! This struck at the roots of hierarchy, and threw the dark shadow of heresy over all the rest of his doctrines.

In the physiological portion of his book, it is true that Hartley undertakes to refer the whole of human thought and sensation to vibrations of the brain, and it cannot be denied that Materialism has drawn plentiful nourishment

[2] Hartley, David, Dr., Observations on Man, his Frame, his Duty, and his Expectations, Lond. 1749, 2 vols. 8vo (6th ed. corr. and revised, Lond. 1834). The preface of the author is dated December 1748. Previously, in the year 1746, there appeared a work by the same author, "De Sensus, Motus et Idearum Generatione," which, however, met with less approval. The statement is inaccurate in Hettner, Literaturgesch. des 18ten Jahrh., i. S. 422, that Priestley issued in the year 1775 a "third and last portion" of the "Observations" under the title "Theory of the Human Mind." Comp. Note 7, *infra*.

from this theory. In Hartley's statement of it, however, it does not offend against orthodoxy. Hartley dutifully divides man into two parts: Body and Soul. The Body is the instrument of the Soul: the brain the instrument of sensation and thought. Other systems also, he remarks, assume that every change of the mind is accompanied by a corresponding change in the body. This system only attempts, supporting itself on the doctrine of the association of ideas, to afford a complete theory of these correlated changes. The doctrine of the association of ideas as the foundation of mental phenomena is, in a germinal form, already to be found in Locke. It was a clergyman, the Rev. Mr. Gay,[3] who was Hartley's immediate predecessor; he had tried to explain all the operations of the soul by the combination of associations, and this psychological basis has continued in England down to our own days without any one's seriously doubting that at the bottom of the association are also fixed antecedent movements in the brain, or, more cautiously expressed, that they are accompanied by corresponding functions of the brain. To this Hartley did nothing but add the physiological theory; but it is precisely this circumstance which made him, despite all his protests, a Materialist. So long, namely, as we speak with a vague generality of the functions of the brain, the mind may be allowed to use its instrument at will without any obvious contradiction. But as soon as we attempt to carry into detail the general idea, it becomes clear that the material brain also is subject to the laws of material nature. The vibrations which appeared to accompany thought so innocently, discover themselves now as products of a mechanism which, set in motion from without, must work according to the laws of the material world.[4] We do not at once get so far as Kant's bold idea

[3] Hartley, as he himself relates in the preface to the "Observations," had been first set thinking by a remark made in conversation by Gay. He then set forth his views in an essay on the principle of virtue, which Law introduced into his English translation of King, "De Origine Mali."

[4] The chief criterion of strict Materialism, as opposed to Hylo-

that a series of actions may, as *phenomenon*, be subject to an absolute necessity; while the same series may, as "*Ding-an-sich*," rest upon a foundation of freedom. The idea of necessity is inevitably implied in the functions of the brain, and necessity in the psychological sphere is the immediate consequence. Hartley admits this consequence, but he appears only to have done so after many years' study of the association theory, and to have adopted it reluctantly. So that a point which Hobbes dealt with quite openly and unconcernedly, which Leibniz disposed of without discovering in it any offence to religion, causes great difficulties to the 'Materialist' Hartley. He defends himself by not denying the *practical* freedom of the will—that is, Responsibility; but he seeks with still greater zeal to demonstrate that he also admits the practical eternity of punishment—that is, the extremely long duration and the intense degree of the punishment, which are enough to frighten sinners, and to make the salvation promised by the Church appear an infinite blessing.

Hartley's principal book was translated into French and German, but with a noteworthy difference. Both translators consider the book to consist of two heterogeneous parts, but the German holds the theological portion to be the most important, and gives only a concise sketch[5] of the theory of associations. The French translator confines himself to the physiological explanation, and leaves the theology out.[6] The course taken by the French translator

zoism (comp. Note 1 to First Section, p. 3 foll.), appears also in Hartley, and therefore, in spite of his religious views, he may be counted with the Materialists.

[5] David Hartley's Betrachtungen über den Menschen, seine Natur, seine Pflichten und Erwartungen, aus dem Engl. übersetzt und mit Anmerkungen und Zusätzen begleitet, 2 Bde. Rostock u. Leipzig, 1772–73. The editor and author of the notes and additions (the translation was made by the 'Magister' von Spieren), H. A. Pistorius, dedicates his work to the well-known free-thinking theologian the Consistorialrath Spalding, who, on the occasion of a discussion on the consistency of Determinism with Christianity, called his attention to Hartley.

[6] Explication physique des Idées et des Mouvements tant Volontaires qu'in Volontaires, trad. de l'Anglais de M. Hartley par l'Abbé Jurain, Prof. de Math. à Reims, Reims, 1775; with a dedication to Buffon.

was also taken by Hartley's somewhat bolder successor, Priestley, who, although himself a theologian, likewise omitted the theological portion in the edition he published of Hartley's book.[7] Priestley was, of course, constantly engaged in controversy, and it cannot be disputed that his 'Materialism' played a great part in the attacks of his opponents; but at the same time we must not overlook that through quite other things he challenged the orthodox or conservative. That he found leisure-time enough in his position as pastor of a dissenting congregation for important scientific investigations is nowadays much more generally known than that he was one of the most fearless and zealous champions of Rationalism. He wrote a work in two volumes on the "Corruptions of Christianity," amongst which he included the doctrine of Christ's divinity; while in another work he taught Natural Religion.[8] Politically as well as theologically a freethinker, he was not sparing in condemnation of the Government, and attacked especially the ecclesiastical institutions and the position of the Establishment. We can easily understand that

[7] Comp. Hartley's Theory of the Human Mind, on the principle of the association of ideas, with Essays relating to the subject of it by Joseph Priestley, Lond. 1775 (2d ed. 1790). Hettner (i. 422) erroneously supposes this to be a third part of Hartley's book. It is only a selection from the first part, for Priestley omitted even the anatomy for the most part, and chiefly gave the psychological theory of Hartley, together with his own observations on the same subject.

[8] Comp. History of the Corruptions of Christianity, by Joseph Priestley, LL.D., F.R.S., 2 vols. 8vo, Lond. 1782 (translated into German, 2 Bde. Berlin, 1785). Dr. Joseph Priestley, member of the Imperial Academy of St. Petersburg and the Royal Society of London, Institutes of Natural and Revealed Religion: Lond. 1772 (translated into German, with notes, Frankfurt and Leipzig, 1782). The works dealing specially with Materialism, so far as I know, have not been translated into German. Comp. Disquisitions relative to Matter and Spirit, with a History of the Philosophical Doctrine concerning the Origin of the Soul and the Nature of Matter, with its influence on Christianity, especially with respect to the Doctrine of the Preexistence of Christ, Lond. 1777.

The Doctrine of Philosophical Necessity illustrated, with an Answer to the Letters on Materialism, Lond. 1777.

The Letters on Materialism referred to were a controversial publication by Richard Price, who not only attacked Priestley, but appeared in general as the opponent of the Empiricism and Sensationalism then ruling in English philosophy.

such a man must have become the object of persecutions, even though he had never taught that the sensations are functions of the brain.

And here we may point out another very characteristic trait of this English Materialism. The actual head and leader of the English unbelievers at that time was not so much Hartley the Materialist as Hume the Sceptic, a man whose views put an end as well to Materialism as to the dogmatism of religion and metaphysics. Priestley, however, wrote against him from the standpoint of teleology and theism, exactly as the German Rationalists were at the same time writing against Materialism. But Priestley attacked also the "Système de la Nature"—the masterpiece of French Materialism—in which, nevertheless, atheistic zeal very distinctly outweighed the materialistic theory. That he was entirely in earnest in these attacks is shown not only by the tone of the fullest conviction in which, quite in the sense of Boyle, Newton, and Clarke, he regarded the world as the product of a conscious Creator, but quite as much by the recurrent attempt—an attempt which reminds us of Schleiermacher—to win again for religion, by purifying it of superstition, the spirits that had been estranged from it.[9]

Hence it comes, also, that Hartley as well as Priestley was attentively read in Germany, where rationalistic theologians were then very numerous; but it was for their theology rather than their Materialism. In France, on the contrary, where there was no such school of serious and

[9] Comp. Joseph Priestley's Briefe an einen philos. Zweifler in Beziehung auf Hume's Gespräche, das System der Natur und ähnliche Schriften. Aus dem Englischen, Leipz. 1782. (The original Letter to a Philosophical Unbeliever, appeared Bath 1780.) The anonymous translator compared Priestley with *Reimarus* and *Jerusalem*, and remarks correctly enough that Priestley has very often misunderstood Hume; but this does not lessen the value of his own views. Besides Priestley's first philosophical work, "Examination of Dr. Reid's Inquiry into the Human Mind, Dr. Beattie's Essay on the Nature and Immutability of Truth, and Dr. Oswald's Appeal to Common Sense, Lond. 1774, was so far on the side of Hume, that it undertook a refutation of the philosophy of Common Sense as directed against Hume.

pious Rationalists, it was the Materialism only of these English writers that exercised any influence; but in this point France had at that time no need of further scientific stimulus. Starting from earlier English influences, a spirit had been there developed which boldly strode past any difficulties in the theory, and upon a hastily constructed foundation of scientific facts and theories raised an edifice of the most venturous consequences. De la Mettrie wrote simultaneously with Hartley, and the "System of Nature" found an opponent in Priestley. These two circumstances show clearly enough that Hartley and Priestley are, for the history of Materialism, as a whole, of but slight importance, although indeed they are of great interest in connection with the progress of materialistic modes of thought in England.

As the national mind in England showed a tendency to Materialism, so the favourite philosophy of the French, it is quite obvious, was originally Scepticism. The pious Charron and the worldly Montaigne agree in undermining dogmatism, and their work is continued by La Mothe le Vayer and Pierre Bayle, after Gassendi and Descartes had come between to open the way for the mechanical conception of nature. So powerful continued to be the influence of the sceptical tendency in France, that amongst the Materialists of the eighteenth century, even those who are called the most extreme and decided remain widely removed from the systematic finality of a Hobbes, and appear to employ their Materialism only as a means of keeping religious belief in check. Diderot commenced his struggle against the Church under the standard of Scepticism, and even De la Mettrie, who of all the Frenchmen of the eighteenth century attached himself most closely to the dogmatic Materialism of Epikuros, calls himself a Pyrrhonist, and describes Montaigne as the first Frenchman who ventured to think.[10]

[10] Comp. Homme Machine, Œuvres Phil. de M. de la Mettrie, iii. p. 57, and Discours sur le Bonheur (where Montaigne is often quoted), Œuvres, ii. 182.

La Mothe le Vayer was a member of the Council of State under Louis XIV. and tutor of the young prince who became Duke of Orleans. In his "Five Dialogues," indeed, he exalted faith at the expense of theology, and in showing that the imaginary knowledge of the philosophers, like that of the theologians, amounts to nothing, he did not omit to exhibit doubt itself as a preparation for submission to the revealed religion; but the tone of his writings is very different from that of a Pascal, whose original Scepticism was ultimately fused into an intense hatred of the philosophers, and whose reverence for faith was not only honest, but even narrow and fanatical. Hobbes also, as we know, exalted faith that he might attack theology. If La Mothe was no Hobbes, he was certainly no Pascal either.[11] At court he was regarded as an unbeliever, and he maintained his position only by the unexceptionable austerity of his life, by reserve, and calm superiority of culture. The influence of his writings was at least favourable to the cause of enlightenment, and the great consideration which he enjoyed, especially among the upper classes must have very much increased this influence.

Incomparably more important was, of course, the influence of Bayle. Pierre Bayle—who, the child of Protestant parents, was as a young man converted by the Jesuits, but speedily returned to Protestantism—by the severe laws as to mass enforced by Louis XIV. against the Protestants was driven into Holland, which was at that time the favourite asylum of the freethinkers of all nations. Bayle was a Cartesian, but he drew from the main principles of the system other consequences than its author. While Descartes everywhere appeared to maintain the consistency of religion and science, Bayle intentionally pointed out their disagreements. In his famous "Critical and Historical Dictionary," he nowhere, as Voltaire remarks,

[11] Hettner, ii. 9, puts La Mothe and Pascal together, which, when we consider the very different characters of these two authors, seems to me not quite right.

in a single line openly attacked Christianity, but he also wrote no line which was not intended to awaken doubt. The contradiction between reason and revelation was apparently decided in favour of the latter, but it was intended that the reader should come to an opposite decision. The influence of this book was as important as that of any book can be. Whilst the mass of various knowledge that was here made most conveniently accessible was calculated to attract the scholar, the herd of superficial readers were fascinated by the piquant and pleasing, if often wilfully offensive, treatment of scientific subjects. "His style," says Hettner,[12] "is of the most dramatic vivacity, and fresh, direct, bold, provoking, and yet ever clear and rapid in the attainment of its aim: while he seems only to be skilfully playing with the subject, he probes and dissects it to its inmost depths." "From Bayle comes the controversial style employed by Voltaire and the French Encyclopædists: even for the literary manner of Lessing, it is not without significance that he studied Bayle much in his youth."

With the death of Louis XIV. (1715) came that remarkable turning-point in modern history, which was as important for the philosophic modes of thought of the educated, as for the social and political fortunes of the nations: the intellectual intercourse between England and France, which developed so suddenly and in such intensity. This transition is pictured by Buckle in his "History of Civilisation" with vivid, perhaps here and there somewhat exaggerated, colours. He doubts whether towards the end of the seventeenth century there were even five persons in France, engaged in literature or science, who were acquainted with the English language.[13] The national vanity had lent to French society a self-sufficiency which despised English culture as barbarous, and the two Revolutions which England had undergone could only increase

[12] Comp. the very good characterisation of Bayle and his influence in Hettner, ii. 45-50.

[13] Buckle, History of Civilisation in England, ii. 214.

this contemptuous feeling so long as the brilliance of the court and the victories of their grand monarch allowed them to forget at what sacrifice of public happiness this splendour was purchased. When, however, as the king grew old, the pressure grew greater and the brilliance fell away, the more perceptible became the complaints and the grievances of the people, and the thought awoke in all thinking minds, that the nation with its submission to despotism had entered upon a path of destruction. Intercourse with England was renewed: while in earlier times men like Bacon and Hobbes had sought to complete their education in France, the best minds of France now crowded to England,[14] and worked hard to learn English and the literature of the English.

In the sphere of politics the French took away with them from England the idea of civil freedom and of the rights of the individual; but these ideas were combined with the democratic tendency which awoke in France with irresistible strength, and which was at root, as De Toqueville[15] has shown, a product of that same monarchical government which found in it its terrible fate. Similarly in the sphere of speculation English Materialism combined with French Scepticism, and the product of this combination was the radical rejection of Christianity and the Church, which in England since Newton and Boyle have made such excellent terms with the mechanical conception of nature. Singular and yet quite capable of explanation is it that the philosophy of Newton should in France be made to further Atheism, while it had been introduced into France with the certificate that it was less injurious to faith than Cartesianism!

It was of course Voltaire who introduced it, one of the first among those men who furthered the connection of the

[14] Comp. the long lists of Frenchmen who visited England and understood English given in Buckle, l. c., ii. 215–223.

[15] De Toqueville, L'Ancien Régime et la Revolution, 1856; [Tr. State of Society in France before the Revolution, 2d ed. 1873].

French and English intellectual tendencies, and certainly the most influential of the whole series.

Voltaire's prodigious activity is to-day justly placed in a clearer light than was customary in the first half of this century. Englishmen and Germans vie with each other in securing for the great Frenchman, without palliating his defects, the place due to him in the history of our intellectual life.[16] The cause of this temporary depreciation of him Du Bois-Reymond finds, "paradox as it may sound," in the fact "that we are all more or less Voltaireans—Voltaireans without knowing it, and without being called so." "So powerfully has he prevailed, that the ideal advantages for which he struggled a long life through with unwearied zeal, with passionate devotion, with every weapon of the intellect, above all, with his terrible ridicule—toleration, intellectual freedom, respect for man, justice—have become to us as the natural elements of life, as the air, of which we only think when we have it no more—in a word, that what once flowed from Voltaire's pen as a daring speculation is to-day become a commonplace."[17] Even the fact that Voltaire secured recognition for the Newtonian cosmology on the Continent has long been too lightly estimated, as well with regard to his understanding of Newton and the independence of his conduct, as also with respect to the greatness of the difficulties to be surmounted. We need only point out that the "Éléments de la Philosophie de Newton" was not allowed to be printed in France, and that this work also had to seek assistance in the freedom of the Netherlands! We must not, however, suppose that Voltaire employs Newton's cosmology as a weapon to attack Christianity, and that he furnishes it with the caustic Vol-

[16] Among the Englishmen we must here especially mention Buckle: among German writers Hettner in the Literg. des 18ten Jahrb.; further, Strauss, Voltaire, 1870, and with especial reference to a particular department, but not without general interest, Du Bois-Reymond's Lecture, Voltaire in s. Bez. zur Naturwissensch., Berlin, 1868.

[17] Du Bois-Reymond, *l. c.*, S. 6.

tairean satire. The work is, on the whole, as seriously and calmly as it is clearly and simply written: indeed, many philosophical questions seem to be treated with a certain timidity, especially where Leibniz, to whose system Voltaire repeatedly refers, is bolder and more consequent than Newton. On occasion of the question whether we must suppose a sufficient reason for God's actions, Voltaire praises Leibniz highly, who answers this question in the affirmative. According to Newton, God has so arranged many things—as, for instance, the movement of the planets from west to east—as they are, simply because he chose to do so without there being any other reason for this than the divine will. Voltaire feels that the arguments which Clarke adduces against Leibniz are not quite satisfactory, and he endeavours to support them with reasons of his own. He is just as vacillating in the question of free-will.[18] Later, of course, we find in Voltaire the concise summing up of a prolix inquiry in Locke — "to be free means to be able to do what we like, not to be able to will as we like;" and this statement, rightly understood, agrees with Determinism and Leibniz's theory of freedom. In the "Philosophy of Newton," 1738, however, Voltaire shows himself still too much involved in the doctrine of Clarke to attain perfect clearness. He thinks that freedom is perhaps possible to indifference, but is unimportant. The question is not whether I can move the left or right foot without any other cause than my own will, but whether Cartouche and Nadir Schah could have avoided the shed-

[18] The views here mentioned are to be found in the Éléments de la Philosophie de Newton, 1738, i. c. 3 and 4, Œuvres compl., 1784, t. 31. Hettner's Litg. ii. 206 ff., has followed in the order of time Voltaire's changes of opinion as to freewill. What is of most importance for us here is to show quite clearly what Voltaire had taught *before the appearance of De la Mettrie;* for in fact the most distinct expressions of Voltaire in this, as in many other questions, are to be found in the "Philosophe Ignorant," which was written in 1767, *twenty years, therefore, after "L'Homme Machine."* Depreciatingly as Voltaire judges the author of "L'Homme Machine," it is nevertheless quite possible that its appearance and its arguments have had some influence upon Voltaire.

ding of blood. Voltaire thinks of course with Locke[19] and Leibniz that they could *not;* but the whole question is how is this *not* to be explained. The Determinist, who seeks responsibility in the character of man, will deny that a persistent will can be formed in him in opposition to the character. If we find an apparent instance, this only proves that in the character of such a man forces still slumbered and could be awakened which we had previously overlooked. But if we will in this way decide any one of the questions relating to the will, the problem of decision in a case of apparently complete indifference—the case of the old scholastic *equilibrium arbitrii*—is by no means so unimportant as Voltaire believes. It is only by getting rid of this phantom that it becomes at all possible to apply scientific principles to the problems of the will.

When such is his attitude with regard to these questions, there is no room whatever to doubt that Voltaire was entirely serious in his approbation of Newton's views as to God or the purpose visible in the universe. How came it, then, that the Newtonian system could nevertheless in France further the cause of Materialism and of Atheism?

We must here never forget that the new cosmology had made the best heads in France reconsider and re-examine with the freshest interest all the questions which had been already raised in the time of Descartes. We have seen the contribution made by Descartes to the mechanical theory, and we shall soon come upon yet further traces of it; but on the whole, the stimulating activity of Cartesianism was already at the outset of the eighteenth century pretty well exhausted. Especially was no further very great influence upon the French schools to be expected from him, since he had been tamed by the Jesuits and clipped—to suit their purposes. It is not a matter of indifference whether a series of great ideas act upon one's contemporaries in their fresh originality, or whether they are transformed into a mere mixture with plentiful addition

[19] Locke, Essay concerning Human Understanding, ii. c. 21, § 20–27.

of traditionary prejudices. Nor, again, is it indifferent with what tone and attitude men's minds receive a new doctrine. Yet we must boldly maintain that, for the complete working out of the cosmology founded by Newton, no more favourable circumstances, no more favourable tone of thought, could be found than those in France in the eighteenth century.

The 'vortices' of Descartes failed to be confirmed by mathematical theory. Mathematics were the sign in which Newton conquered. Du Bois-Reymond very justly remarks that Voltaire's influence upon the elegant world of *Salons* did not contribute less to naturalise the new cosmology. "Only when Fontenelle's 'Mondes' was driven out by the 'Eléments' of Voltaire from the dressing-tables of the ladies, could Newton's victory over Descartes be pronounced in France complete." Even that must not be lacking any more than the satisfaction of the national vanity secured by the Newtonian theory receiving the carefully considered confirmation of a Frenchman;[20] but at the very foundation of the movement which brought about the great transition, we see the powerful impetus which the mathematical sense of the French received through the influence of Newton. The magnificent phenomena of the seventeenth century were renewed in increased splendour, and to the age of a Pascal and Fermat succeeded with Maupertuis and D'Alembert the long series of French mathematicians of the eighteenth century, until Laplace drew the last consequences of the Newtonian cosmology in discarding even the hypothesis of a creator.

Voltaire himself, despite all his radicalism, did not draw such consequences. Although he was far indeed removed from allowing his masters, Newton and Clarke, to dictate a peace with the Church, he was nevertheless through his life true to the two great principles of their metaphysic. It cannot be denied that the same man who worked with all his might to overthrow ecclesiastical dogma, the author

[20] Comp. Du Bois-Reymond, Voltaire in s. Bez. zur Naturw., S. 10

of the notorious phrase, "écrasez l'infâme," is yet a great supporter of a purified teleology, and that he is perhaps more serious as to the existence of God than any one of the English Deists. To him God is a deliberating artist who has created the world according to reasons of wise purpose. Although later Voltaire undoubtedly went over to a gloomier theory, which preferred to think of the evil in the world, yet nothing remained further from his mind than the assumption of blindly acting natural laws.[21]

Voltaire would not be a Materialist. There is obviously at work in his mind a crude unconscious beginning of the Kantian standpoint, when he constantly comes back to the idea most sharply expressed in the well-known words, "If there were no God, it would be necessary to invent him." We postulate the existence of God as the foundation of moral conduct, teaches Kant. Voltaire thinks that if one were to give Bayle, who held an atheistic state to be possible, five or six hundred peasants to rule, he would immediately have preached the doctrine of a divine retribution. Apart from the playfulness of the remark, it will be found to contain Voltaire's real view that the idea of God is indispensable for the maintenance of virtue and justice.

We can now understand that Voltaire quite seriously opposed the 'System of Nature,' the 'Bible of Atheism,' though not with the mad fanaticism of Rousseau. Much nearer was Voltaire to anthropological Materialism. Here Locke was his guide, who appears to have exercised the utmost influence upon the whole sphere of Voltaire's philosophy. Locke himself, of course, leaves this point undecided. Although he held to the fact that the whole intellectual life of mankind flows from the activity of the senses, yet he leaves it an open question whether it is *matter* that receives the materials provided by the senses, and whether therefore *matter* thinks or not. Against those, however, who kept their feet steadily upon this,

[21] Hettner, ii. 193, shows that Voltaire was first startled out of his earlier optimism by the earthquake of Lisbon in 1755.

that the nature of matter as the extended is inconsistent with the nature of thought, Locke lets fall the somewhat superficial remark that it is godless to maintain that a thinking matter is impossible; for if God had willed it, he might by his omnipotence have created matter capable of thinking. This theological turn of the matter pleased Voltaire, for it promised a desirable support for controversy with the believers. Voltaire thought himself so enthusiastically into this question, that he no longer left it unsettled with Locke, but decided it in the materialistic sense.[22]

"I am body," says he in his London letter on the English, "and I think; more I do not know. Shall I then attribute to an unknown cause what I can so easily attribute to the only fruitful cause I am acquainted with? In fact, where is the man who, without an absurd godlessness, dare assert that it is impossible for the Creator to endow matter with thought and feeling?"

Of course we can scarcely claim this expression for the stricter form of Materialism. Voltaire believed that we must have lost all common sense before he could suppose that the mere motion of matter is sufficient to produce feeling and thinking beings. And therefore, not only is a Creator necessary in order to make matter capable of thought, but even the Creator will be unable to produce thought in matter, as was the case with Hobbes, by means of mere motion of matter. It will be a special force that is communicated to matter, and this force will in all probability—according to Voltaire's idea—although it is not motion, yet be able to produce motion (in the voluntary actions). But if the matter is so taken, we are in the sphere of Hylozoism. (Comp. Note 1 to First Sect., vol. i. p. 3.)

Since we possess the law of the conservation of force, there is in a purely theoretical respect an enormous chasm between strict Materialism and Hylozoism. The former is compatible with that law: the latter not. Kant, indeed, had already declared Hylozoism to be the death of all

[22] Comp. Hettner, ii. 183.

Naturphilosophie,[23] obviously only because it renders the mechanical conception of nature impossible. Nevertheless it would be incorrect to lay too much stress upon this distinction in the case of Voltaire. With him certain conclusions are of more importance than the principles; and practical relations to Christian belief, and to the supremacy of the Church based upon belief, determine his standpoint. His Materialism accordingly grew stronger with the keenness of his attack upon belief. For all that, he had never made up his mind on the question of immortality. He halted between the theoretical reasons which made it improbable, and the practical ones which appeared to recommend it; and here again we find that trait reminding us of Kant, that a doctrine is retained as the presupposition and support of morality which the understanding finds at least incapable of proof.[24]

In moral philosophy also Voltaire likewise followed English suggestions, but his authority on this point was no longer Locke, but his pupil, Lord Shaftesbury, a man especially interesting to us for his deep influence on the leading minds of Germany in the eighteenth century. Locke had combated innate ideas in the sphere of morals also, and had notably popularised the relativity of good and evil as propounded by Hobbes. He gathers materials from all possible books of travel in order to show us how the Mingrelians bury their children alive without any remorse, and how the Tououpinambos believe that they will earn Paradise by revenge and the eating of their enemies.[25] Voltaire also on occasion can employ such things, but they do not in the

[23] Kant's Metaphys. Anfangsgr. der Naturwissensch., III. Hauptst. Lehrs. 3 Anm., Werke, Hartenst., iv. 440.

[24] How Voltaire became more aggressive, especially after 1761, is very well shown in Strauss, Voltaire, 1870, S. 188. As to his vacillation with regard to the doctrine of immortality and the features which remind us of Kant, comp. Hettner, ii. 201 ff.; as to the latter in particular, the often-quoted words—"Woe to those who fight each other when swimming, let him who can get to land; but he who says, You swim in vain, for there is no land, dispirits me and robs me of all my strength."

[25] Locke, Essay conc. Human Underst., i. 3, § 9.

least shake his belief in the doctrine that the idea of right and wrong in its innermost being is everywhere one and the same. If this is not born with man as a fully formed idea, he brings at least into the world the predisposition to it. Just as a man is born with legs, although he only later learns to walk, so in the same way he brings with him into the world the organ that is to distinguish right and wrong, and the development of his mind necessarily calls the function of this organ into exercise.[26]

Shaftesbury was a man of idealistic vehemence of enthusiasm, and a poetic conception of the world which, with its pure sense for the beautiful, and its deep comprehension of classical antiquity, were especially adapted to influence Germany, at that time ripening to the richest development of its national literature; at the same time the French drew rich nourishment from him, and by no means positive doctrines only—such as the theory that there lies in every human breast a natural germ of enthusiasm for virtue. And yet we have to learn this doctrine! Locke had indeed looked upon 'Enthusiasm' with no favourable eyes as the source of extravagance and self-exultation, as a noxious product of the overheated brain, and as utterly opposed to all rational thought.[27] And this is entirely in accordance with the hard and sterile prose of his whole manner of thought. Shaftesbury is here better guided by his poetical sense than Locke had been by his understanding. He finds in Art, in the Beautiful, something for which there is no place whatever provided in the psychology of Locke, except along with the calumniated enthusiasm, and yet the value and dignity of which is to him beyond all doubt. But this sheds a bright ray of light upon the whole field, and without denying that enthusiasm often produces extravagance and superstition, Shaftesbury nevertheless finds in it the spring of all that the human mind shows of noblest and greatest. And

[26] Comp. Hettner, ii. 210 ff.

[27] Essay conc. Human Underst., iv. c. 19, "Of Enthusiasm."

now we have found the place where morality has its origin. From the same source flows Religion—good of course as well as bad: the comforter of mankind in misfortune, and the fury who kindles the martyr-pile, the purest elevation of the heart to God, and the vilest desecration of the nobility of human nature. As with Hobbes, Religion and Superstition move together, but the wall of distinction between them is no longer the heavy sword of "Leviathan," but—the æsthetic sense. Good-tempered, gay, and cheerful people construct for themselves a noble, exalted, and yet liberal and friendly race of gods; gloomy, morose, and discontented natures produce the gods of hatred and of revenge.

Shaftesbury tries hard to range Christianity on the side of the cheerful and good-tempered religions, but with what great violences to historical Christianity! with what keen censure of ecclesiastical institutions! with what unsparing condemnation of many a tradition prized by believers as sacred and indisputable!

We have an expression of censure from Shaftesbury directed against the attitude towards religion of his master, Locke, whom in all other respects he so highly honoured, though he speaks not so much of Locke personally, but rather includes the whole class of the English Deists, and makes against them a collective accusation of Hobbism. The important point in all this with reference to most English freethinkers is the intimation of their inner aversion from what forms the very essence and spirit of religion. The editor of Locke's works, however, thinks himself entitled to turn this weapon against the enemy; while he defends Locke's orthodoxy, he describes Shaftesbury as a "sneering infidel with regard to revealed religion, and a rank enthusiast in morals." [28]

The man is not wholly wrong, especially if we judge the matter from that clerical standpoint which places the

[28] Comp. the Works of John Locke in ten vols., 10th ed., Lond., 1801. Life of the Author, vol. i. p. xxiv. n.

authority of the Church higher than the contents of its doctrines. But we may go much further, and say, Shaftesbury stood at heart nearer to religion generally than Locke, but did not understand the specific spirit of Christianity. His religion was the religion of the happy, who do not find it very difficult to preserve their complacency. His philosophy has been described as aristocratic, but we must add, or rather alter—it is the philosophy of the naive and harmless child placed amidst especially favourable circumstances, who takes his horizon for the horizon of humanity. Christianity was once preached as the religion of the poor and miserable, but through a remarkable dialectic of history it has at the same time become the favourite religion of those who hold poverty and misery to be an everlasting ordinance of God in this life, and who are specially well pleased with this divine arrangement because it is the natural foundation of their own favoured position. To disregard this supposed eternal order may under certain circumstances be equivalent to the sharpest direct attack. We must here again only regard the influence of Shaftesbury upon the minds of men like Lessing, Herder, and Schiller, in order to perceive how slight the step may be from naive optimism to the conscious resolution so to shape the world that it may correspond to this optimism.

It is this that explains that remarkable alliance of extremes against Shaftesbury so admirably shown by his latest biographer;[29] on the one side Mandeville, the author of the "Fable of the Bees," on the other the orthodox. Only we must rightly understand Mandeville in order to find in one and the same person the apologist of vice and the defender of the Capitol of the State Church. When Mandeville maintains against Shaftesbury that true virtue consists in self-conquest and the subjection of the natural

[29] Dr. Gideon Spicker, Die Philos. des Grafen von Shaftesbury, Freiburg, 1872, S. 71 ff. With regard to what I have to say of Shaftesbury, I may here, for brevity's sake, once for all refer to this valuable monograph. Comp. further also Hettner, i. 211-214.

inclinations, he does not mean the conquest of his own self and his own inclinations—for if these do not strive after unlimited satisfaction, all commerce and intercourse stands still and the state must perish! He means the selfishness and the appetites of the working-classes, for "Temperate living and constant employment is the direct road for the poor to rational happiness, and to riches and strength for the state." [30]

Whence Voltaire drew his nourishment is easily to be seen if we remember that Shaftesbury attacked not only the stake and hell, miracles and anathema, but also the pulpit and the catechism, and that he considered it his highest distinction to be abused by the clergy; but it is unmistakable that the positive features also of Shaftesbury's philosophy have not been without their effect upon him, and especially that element in Voltaire's views which we have already pointed out as a prelude to the position taken up by Kant may in its root be traced back to Shaftesbury.

A much more lively influence of course must have been exercised by the positive features of this philosophy upon a man like Diderot. This great leader of the intellectual movement of the eighteenth century was a thoroughly enthusiastic nature. Rosenkranz, who has traced with sure hand the weaknesses of his contradictory character and his unorganised literary activity, brings also into prominence the glowing geniality of his nature in a striking manner. "We can only understand him when we consider that he, like Sokrates, taught rather orally than in writing,

[30] Comp. Karl Marx, On Capital, Hamburg, 1867, S. 602, note 73. When Hettner (i. 213) observes that the question is not whether Mandeville is at one with Christianity in his notion of virtue, but whether he is at one with himself, the answer is very simple. The apologist of vice cannot think of demanding for *all* the virtue of self-denial, but it harmonises admirably with his principles to preach Christianity and Christian virtue *to the poor*. The sermon is apparently of general application; but he who has the means to indulge his vices knows all the same what he can do, and the stability of society is ensured.

[The quotation in the text is not from Mandeville, as the ambiguity of Marx's note has led Lange to suppose, but from an anonymous "Essay on Trade and Commerce," &c., London, 1770, attributed to J. Cunningham, p. 54.—TR.]

and that in him, as with Sokrates, the process of the times from the Regency to the Revolution fulfilled itself in all the phases of its development. There was in Diderot, as in Sokrates, something demonic. He was then only completely himself when, like Sokrates, he had raised himself up to the ideas of the True, the Good and the Beautiful. Only in this ecstasy, which was, according to his own account, manifested by external signs, and which he first perceived by an agitation in the hair over the middle of the forehead and by a tremor running through all his limbs, did he become the real Diderot, whose enraptured eloquence, like that of Sokrates, carried every listener away."[31] Such a man could not only grow enthusiastic over Shaftesbury's "Moralists," this "dithyramb to the everlasting beauty which runs through the whole world and combines all apparent dissonances into deep full-toned harmony" (Hettner); but even Richardson's novels, in which the moral tendency is of primitive simplicity, moved him by the liveliness of their treatment into enthusiastic admiration. In all the variations of his constantly changing standpoint he retained the belief in virtue and in its deep foundation in the nature of our souls, a fixed point which he contrived to reconcile with the apparently most contradictory elements of his theoretical speculation.

Diderot is so persistently represented as the head and leader of French Materialism, at least as the first man who carried out the 'Lockian Sensualism' into Materialism, that it will be necessary for us in the next chapter once for all to dispose of the Hegelian passion for construction, which, with its sovereign contempt of all chronology, has nowhere been guilty of so great a confusion as in dealing with the philosophy of the seventeenth and eighteenth centuries. We have only to rest upon the simple facts that Diderot

[31] Rosenkranz, Diderot's Leben und Werke, 2 Bde., Leipz. 1866. The passage quoted is at ii. 410, 411. Although we do not agree with the author as to the position of Diderot in the history of Materialism, we have employed as much as possible this very desirable and valuable contribution to the intellectual movement of the eighteenth century.

was nothing less than a Materialist before the appearance of the "L'Homme Machine," that his Materialism was only developed through his intercourse with the group that gathered around Holbach, and that the writings of other Frenchmen, such as Maupertuis, Robinet, and probably even the abused La Mettrie, exercised a more decisive influence upon him than Diderot on his part exercised upon any noteworthy advocate of Materialism. We say 'decisive' influence with reference to the assumption of a clear theoretical standpoint—for a stimulating influence of the utmost importance was indeed exercised by Diderot, and it lay in the nature of that seething time that all the various revolutionary tendencies reacted upon each other. If Diderot enthusiastically eulogised morality, the thought of attacking the very basis of morality might be awakened in another mind, whilst in both minds there prevailed the same hatred of priestly morality and of the humiliation of mankind by the despotism of the clergy. Voltaire might arouse Atheists with an apology for the existence of God, because he was above all things concerned to deprive the Church of the monopoly of the theistic doctrine which it had so misused and distorted. In this unceasing torrent of assault upon all authority the tone became undoubtedly more and more radical, and its leaders at length seized upon Materialism as well as Atheism to turn it into a weapon against religion. With all this, however, at a very early period of the movement the most theoretically consistent system of Materialism was ready to hand, whilst the leaders of the movement still rested rather upon English Deism or a mixture of Deism and Scepticism.

Diderot's stimulating efficacy was, it is true, thanks to his rare literary talent and his energetic manner, uncommonly great, as well through his independent philosophical writings, as also especially through his indefatigable activity for the great Encyclopædia. It is indeed also true that Diderot has not always in the Encyclopædia expressed his own individual opinion, but it is just as true that at

its commencement he had not yet got as far as Atheism and Materialism. It is true that great parts of the "Système de la Nature" came from the pen of Diderot, but it is not less true that it was not he who carried Holbach with him to the furthest point, but, on the contrary, Holbach with his firm will and calm clear persistency attached the stronger intellect to his path, and won him over to his ideas.

While La Mettrie (1745) was writing his "Natural History of the Soul," which scarcely veils its Materialism, Diderot was still entirely at the standpoint of Lord Shaftesbury. He toned down in the "Essai sur le Mérite et la Vertu" the sharpness of the original, and in the notes combated views which appeared to him to go too far. This may have been prudent foresight, but his defence of an order in nature (which he later with Holbach attacked), his polemic against Atheism, was here as candid as in the "Pensées Philosophiques," written a year later, in which he is of opinion, still quite in the sense of the English teleology derived from Newton, that it is exactly the scientific research of modern times which has inflicted the greatest blows upon Atheism and Materialism. The wonders of the microscope are the true divine miracles. The wing of a butterfly, the eye of a gnat, are sufficient to demolish Atheism. At the same time there blows here quite another atmosphere, and close by the philosophical annihilation of Atheism burst forth springs of richest nourishment for social Atheism, if we may thus designate for the sake of brevity that Atheism which attacks and rejects the God recognised in the present constitution of society, in State and Church, in the family and in the school.

Diderot ostensibly fights only against intolerance, "since he sees the whimpering dead shut up in hellish prisons, and hears their sobs, their cries of woe." But this intolerance hangs together with the prevalent conception of God! "What wrongs have these unhappy souls com-

mitted?" asks Diderot; "who has condemned them to these torments? The God whom they have offended. Who is then this God? A God of infinite goodness. What! can a God of infinite goodness find any pleasure in bathing himself in tears? These are people of whom we must not say that they fear God, but that they are frightened of him. Considering the picture that is drawn for us of the Supreme Being, of his readiness to anger, of the fury of his vengeance, of the comparatively great number of those whom he allows to perish, as compared with the few to whom he is pleased to stretch forth a saving hand, the most righteous soul must be tempted to wish *that he did not exist.*" [32]

These cutting words, it is certain, acted more energetically on contemporary French society than any passage of "L'Homme Machine," and entirely apart from the speculative theory, any one who finds in Materialism nothing but opposition to religious dogma need not wait for the "Dream of D'Alembert" (1769) in order to designate Diderot as one of the boldest leaders of Materialism. It is no concern of ours, however, to lend our aid to this confusion, however much we are driven by the plan and aim of this work to include, besides the strict Materialism, the consideration of so many related or connected views.

In England the aristocratic Shaftesbury could calmly weigh the God of vengeance in the balances and find him wanting. Even in Germany, although of course much later, could Schiller demand the exclusion from the temples of that God whom nature marks "only on the rack" and who pays himself with the tears of mankind.[33] It was in

[32] Rosenkranz, Diderot, i. S. 39.

[33] Comp. Schiller's Freigeisterei der Leidenschaft, line 75 to end, Werke Hist. Crit. Ausg. iv., Stuttg. 1868, p. 26. That Schiller expresses his own views in these verses, in spite of the note added in "Thalia" (1786, 2 H. p. 59), as well as that at the sacrifice of the inner unity of the poem towards the end he forgets the special occasion and concludes with general ideas on the conception of the Divine Being, scarcely needs further proof. The translator of the "Vrai Sens du Système de la Nature" (under the title "Neunundzwanzig Thesen des Materialismus," Halle, 1873) rightly points out that the lines "Nur auf der Folter

the power of the educated classes to set up a purer conception of God in the place of the one they had overthrown. But to the people, especially the Catholic people of France, the God of vengeance was also the God of love. In its religion, heaven and hell, salvation and damnation, were combined in a mystic unity and in all the stereotyped definiteness of traditional ideas. The God here drawn by Diderot from his shadow side only was *his* God, the God of his confidence as well as of his fear and his daily adoration. This picture might be destroyed as Boniface once destroyed the heathen gods, but it was impossible by a stroke of the pen to set the God of Shaftesbury in its place. One and the same drop put into different chemical solutions gives very different precipitates. Diderot had actually been long fighting for Atheism whilst he was still in theory 'demolishing' it.

Under these circumstances a nearer view of the nature of his Materialism is not of great historical importance, but for the criticism of Materialism a brief discussion of his views will not be wholly out of place. They form, although they are not very definitely developed, yet in clearly recognisable features a modification of Materialism which is new, and in which the chief objection raised against Atomism from Demokritos to Hobbes is apparently avoided.

We have often pointed out that ancient Materialism attributes sensation not to the atoms but to the organisation of small germs, but that this organisation of germs, according to atomistic principles, can be nothing but a peculiar

merkt dich die Natur!" and "Und diesen Nero beten Geister an!" are in entire agreement with Chapter xix. of the "Vrai Sens." But we must not therefore conclude that Schiller had read this pamphlet, still less that his ideas as to the "Système de la Nature" in its doctrinaire breadth and unimaginative prose were very much other than those of Goethe. Similar ideas were found also in Diderot, and in their germ may be traced back to Shaftesbury. That Schiller was busying himself with Diderot at the time in which falls either the production or at least the inner occasion of this poem, see in Palleske, Schiller's Leben u. Werke, 5 Aufl. i. S. 535.

arrangement in space of atoms which, taken separately, are incapable of sensation. We have seen how even Gassendi with all his efforts cannot get over this difficulty, and how Hobbes does not improve things with his magic phrase that simply identifies a particular kind of molecular motion with thought. Nothing was left then but to make the experiment of placing sensation as a property of matter in the smallest particles themselves. This was done by Robinet in his book on "Nature" (1761), while La Mettrie in "L'Homme Machine" (1748) still kept to the old Lucretian conception.[84]

Robinet's singular system, rich in fantastic elements and wild hypothesis, has sometimes been regarded as a distortion of Leibniz's "Monadology," sometimes as a prelude to the "Naturphilosophie" of Schelling, sometimes as absolute Materialism. This last view is the only correct one, although it is true that we may read whole sections of the work without knowing on what ground we stand. Robinet attributes to all the smallest particles life and spirit; even the constituent elements of 'unorganic' nature are living germs, which bear within themselves, only without any *self-consciousness*, the principle of sensation. For the rest, even man knows only—again an important element of the Kantian doctrine—his sensations —not his own essence, nor himself as substance. Robinet, through whole chapters, allows these two principles—the corporeal and the spiritual principle of matter—to act upon each other, as if we were in the sphere of the most unbridled Hylozoism. Suddenly, however, we stumble upon the brief yet very significant explanation that the action of mind upon matter is only a reaction of the material impressions, in which the (subjectively !) voluntary motions of the machine have their origin in nothing else than in the organic (that is here the mechanical) operation

[84] Comp. vol. i. p. 266, and the earlier passages there cited ; and further, Note 11, ibid.

of the machine.[35] This principle is then consistently, although without any ostentation, carried through. Thus, for instance, if a sense impression excites the soul to desire something, this cannot be anything else than what acts conditionally through the mechanical influence of the thinking fibres in the brain upon the appetitive fibres, and when I in pursuit of my desire will stretch out my arm, this will is only the inner, subjective side of the strictly mechanical sequence of natural processes which, proceeding from the brain by means of the nerves and muscles, brings the arm into motion.[36]

Kant's charge against Hylozoism, that it is the death-blow to any philosophy of nature, cannot hit this standpoint. The law of the conservation of force, to speak in the language of our time, is applied by Robinet to all the phenomena of man—from the sense impressions right through the brain functions to words and actions. With great acuteness he connects with it the free-will doctrine of Locke and Voltaire: to be free means to be able to do what one will, not to be able to will what one will. The moving of my arm is voluntary because it has followed upon my act of will. Objectively considered, the origin of this act of will is as necessary an event of nature, as its connection with the result. For the subject, however, this natural necessity disappears, and freedom alone is there. The will follows subjectively only motives of a spiritual nature, but these also are in their turn objectively conditioned through necessary processes in the corresponding fibres of the brain.

We see here again indeed how closely consequent Materialism always lies to the limits of all Materialism. A very little doubt in the absolute reality of matter and its motions, and we have the standpoint of Kant, which

Von der Natur, from the French of J. B. Robinet, Frankf. and Leipz., 1764, S. 385 (iv. partie, iii^e ch. 1^re loi:) "Les determinations d'où proviennent les movements volontaires de la machine, ont elles-mêmes leur origine dans le jeu organique de la machine."

[36] Comp. especially *loc. cit.*, Part iv. chap. xxiii.

regards both causal series—that of nature according to external necessity, and that of our empirical consciousness according to freedom and intellectual motives—as mere phenomena of a hidden third series whose true nature remains incognisable by us.

Diderot had been inclined to such a view long before the appearance of Robinet's work. Maupertuis had in the year 1751 in a pseudonymous essay first spoken of sensitive atoms, and Diderot combats this assumption in his "Thoughts on the Explanation of Nature" (1754) after a fashion which allows us to see how clear he is about it: yet at this time Diderot was still in the standpoint of scepticism, and the treatise of Maupertuis appears on the whole to have remained without exerting very much influence.[37]

Diderot did not adopt the views of Robinet without feeling the weak point which still remains even in this modification of Materialism.[38] In "D'Alembert's Dream," the dreamer repeatedly recurs to this point. The matter is simple. We have now indeed sensitive atoms, but how does this sensation sum itself into the unity of consciousness? The difficulty is not a psychological one, for if the sensations commence—no matter how—like tones in a system of harmonious sounds—once to flow into each other, then we may imagine how a sum of elementary sensations may afford the richest and most significant content of consciousness: but how do the sensations effect this transition from atom to atom through void space? The dreaming D'Alembert, that is, Diderot, has nothing to say in answer to this, but to suppose that the sensitive particles act immediately

[37] Comp. Rosenkranz, Diderot, i. 134 ff. The pseudonymous dissertation of Dr. Baumann (Maupertuis) I have not seen, and it may be open to some doubt, according to Diderot and Rosenkranz, whether it does really contain the Materialism of Robinet—that is, the unconditional dependence of the spiritual upon the purely mechanical series of external events—or whether it inculcates Hylozoism—that is, modifications of the natural mechanism by the spiritual content of nature according to other than purely mechanical laws.

[38] Rosenkranz, Diderot, ii. 243 ff., 247 ff.

upon each other, and so form a *continuum*. But this is to be on the point of giving up Atomism, and consequently to give up that form of Materialism which Ueberweg favoured in the esoteric philosophy of his later years.[39]

We turn now, then, to consider the influence of English Materialism upon Germany. But first let us briefly consider what Germany had achieved for itself in this direction. There is indeed extremely little to be found, and the cause is not to be sought so much in the predominance of an enthusiastic Idealism, as in the general decline which had been brought on by the intellectual exhaustion of the country after the great struggles of the Reformation, by its political agitation, and its moral degeneration. While all other nations profited by the fresh breath of nascent intellectual liberty, it appeared as though Germany had fallen a victim in the struggle to obtain it. Nowhere did ossified dogmatism seem narrower than among the German Protestants, and the natural sciences especially had a difficult position.

"The introduction of the improved Gregorian kalendar was opposed by the Protestant clergy merely because this correction had proceeded from the Catholic Church; in the judgment of the Senate of Tübingen of the 24th November 1583, it is said that Christ cannot be at one with Belial and with Antichrist. Keppler, the great reformer of astronomy, was warned by the Consistory in Stuttgart on the 25th September 1612, that he must subdue his too speculative spirit, and govern himself in all things according to the Word of God, and leave the Testament and Church of the Lord Christ untroubled by his unnecessary subtleties, scruples, and glosses."[40]

[39] Fuller details as to the modifications of Materialism will follow in the Second Book. As to Diderot's Materialism, we may here further point out that he nowhere expresses himself as definitely as Robinet does in the passages above quoted. Rosenkranz finds even in the "Dream of D'Alembert" a Dynamism which, if Diderot here expresses his real view, would make even this most advanced production atheistic indeed, but not strictly Materialistic.

[40] Hettner, Literaturg. d. xviii. Jahr., iii. 1, p. 9.

We seem to find an exception in the introduction of Atomism among the German physicists by Sennert, professor at Wittenberg; and yet neither did physics greatly profit by this innovation, nor did it lead to a conception of nature at all inclining to Materialism. Zeller, indeed, says that Atomism "in a shape not essentially differing from the Demokritic" for a long time maintained such importance among the German physicists, that Leibniz could declare that it had not only caused Ramism[41] to be forgotten, but had also inflicted great injury upon the Peripatetic doctrine: but we may very probably conjecture that Leibniz has exaggerated. At least the traces of Atomism in Sennert's "Epitome Naturalis Scientiae" (Wittenberg, 1618) are so insignificant, that the thoroughly Scholastic basis of his views is at all events less disturbed by his Atomistic heresies than by those elements which he borrowed from Paracelsus.[42]

[41] On Petrus Ramus and his followers in Germany, comp. Zeller, Gesch. d. deutschen Phil., pp. 46–49. Ramus borrowed the main features of the doctrine with which he created such a sensation entirely from Vives. Comp. the Art. "Vives" in the Enc. des ges. Erz. u. Unterrichtswesens.

[42] The whole of Sennert's Atomism seems to run into a timid modification of the Aristotelian doctrine of *fusion*. While expressly rejecting the Atomism of Demokritos, Sennert teaches that the elements in themselves do not consist of direct particles, and that a continuum cannot be composed of indivisible elements. (Epitome Nat. Sci., Wittebergae, 1618, p. 63 ff.) On the other hand, indeed, he supposes that in the fusion the matter of the individual elements is first *in fact*—despite their further divisibility — divided into infinite smallest particles, and so primarily forms only a medley. These particles then react with the primary qualities of Aristotle and the Schoolmen, viz., warmth, cold, dryness, and damp, until their qualities are again in a state of equilibrium—upon which the true Scholastic continuum of the mixture again appears (comp. *loc. cit.* pp. 69, foll. p. 225). With this is connected the further hypothesis that by the side of the 'substantial form' of a whole the substantial forms of its parts still retain a certain although subordinate efficiency.

The difference between this doctrine and a genuine Atomism is seen most clearly in Boyle, who, in several of his works, and especially in the "De Origine Formarum," frequently quotes Sennert and controverts his views. One must nowadays be already accurately acquainted with the Scholastic views of nature, in order to find at all the points in which Sennert ventures to deviate from the orthodox path, while Boyle appears in every line as a physicist in the modern sense of the word. Considered in this light, the whole of the excitement which was pro-

While in France Scepticism was by Montaigne, La Mothe le Vayer, and Bayle, and in England Materialism and Sensationalism by Bacon, Hobbes, and Locke, were in a certain sense raised to the rank of national philosophies, Germany remained the ancestral home of pedantic Scholasticism. The rudeness of the nobility, which Erasmus had already happily characterised by the nickname of 'Centaurs,' was absolutely opposed to the rise of a complete philosophy on the basis of social culture, such as played so great a part in England. The restlessly fermenting element which in France became increasingly active was not entirely wanting in Germany, but it was diverted by the predominance of religious views into various curiously involved, and, at the same time, subterranean paths, and the confessional schism dissipated the best forces of the nation in interminable struggles ending in no lasting result. In the universities an increasingly rude generation took possession of the chairs and benches. Melanchthon's reaction for the regenerated Aristotelianism led under the Epigoni to an intolerance reminding us of the dark times of the Middle Ages. The philosophy of Descartes found safe shelter scarce anywhere but in the little Duisberg, which enjoyed a breath of Flemish intellectual freedom and was protected by the enlightened ruler of Prussia; and even that ambiguous fashion of attack under the form of defence, whose importance we have often observed, was still applied towards the end of the seventeenth century to the Cartesian doctrine. Nevertheless it gradually made way; and towards the end of the century, when the presages of a better time were announcing themselves in many minds, we find numerous complaints of the propagation of 'Atheism' by the Cartesian philosophy. The orthodox were at no time more ready with the accusation of Atheism than then: and yet so much is clear, that those spirits which were struggling for freedom attached them-

duced, according to Leibniz, by Sennert's theory, can only convince us what even in those days Scholastic pedantry must still have been.

selves in Germany to a doctrine with which the Jesuits in France had already come to terms.[43]

Thus, then, it came to pass that Spinoza's influence in Germany became sensible almost simultaneously with the deeper hold taken by Cartesianism. The Spinozists form only the extreme Left in this contest against Scholasticism and orthodoxy, and this brings them nearer to Materialism, though only, of course, so far as is permitted by the mystic and pantheistic elements of Spinoza's teaching. The most important of these German Spinozists is Friedrich Wilhelm Stosch, the author of 'Concordia Rationis et Fidei' (1692), which created great excitement and indignation, and the secret possession of which in Berlin was threatened with a penalty of five hundred thalers. Stosch curtly denies not only the immateriality but also the immortality of the soul. "The soul of man consists in the due admixture of the blood and the juices which flow duly through uninjured channels and produce the various voluntary and involuntary actions." "The spirit is the better part of man—with which he thinks. It consists of the brain and its innumerable organs, which are variously modified by the influx or the circulation of a subtle matter, which is likewise variously modified." "It is clear that the soul or the spirit in itself, and of its own nature, is not immortal, and does not exist outside the human body." [44]

[43] On the spread of Cartesianism in Germany and the struggle connected with it, comp. Zeller, Gesch. d. deutschen Phil., pp. 75–77, and Hettner, Literaturg. d. xviii. Jahr., iii. 1, pp. 36–42. Here we find in particular a correct estimate of the meaning of the struggle which was carried on by the Cartesian Balthasar Bekker against the superstitions of the devil, witchcraft, and ghosts.

[44] Further information as to Stosch, as well as Matthias Knuzen and Theodor Ludwig Lau, in Hettner, Literaturg. d. xviii. Jahr., iii. 1, pp. 45–49. We originally intended to devote a special chapter to Spinoza and Spinozism: this notion had, however, to be abandoned in order not to swell the book unduly, and to prevent its varying from its original character. That in general the connection of Spinozism with Materialism is considerably over-estimated (so far as we do not confound Materialism with all kinds of more or less related tendencies) follows from the last chapter of this section, in which it is shown how Spinozism in Germany could unite itself with idealistic elements, which Materialism has never done.

More popular and incisive was the influence of the English, as well as regards the development of the general opposition to ecclesiastical creeds, as in especial the elaboration of Materialistic views. When in 1680 the Chancellor Kortholt at Kiel wrote his book, "De Tribus Impostoribus Magnis," in which he gave an opposite meaning to the old notorious title of a supposititious book, he meant Herbert of Cherbury, Hobbes, and Spinoza as the three great foes of Christian truth.[45] Thus we find two Englishmen in this trio—one of whom, Hobbes, we have long been acquainted with. Herbert (*ob.* 1648) is one of the oldest and most influential representatives of "Natural Theology," or rational belief in opposition to revealed dogma. Of the influence which he as well as Hobbes exercised in Germany, we have clear traces in the "Compendium de Impostura Religionum," published by Genthe, which cannot possibly belong to the sixteenth century.[46] It is much

[45] Comp. Hettner, Litg., iii. 1, p. 43. On the supposititious book, comp. above, n. 22, vol. i. p. 182.

[46] So it was erroneously assumed in my first ed. after Genthe and Hettner (iii. 1, pp. 8, 35). I have to thank Dr. Weinkauff of Köln, who is thoroughly acquainted with freethinking literature, for a manuscript communication which proves that the "Compendium de Impostura" was in all probability not written until towards the end of the seventeenth century. It is true that the earliest known edition bears the imprint 1598, but this is obviously a fictitious date, and the expert Brunet (Manual du Libraire, Paris, 1864, v. 942) regards the work as a German production of the eighteenth century. It is certain that in 1716 a manuscript of the work was sold at auction in Berlin for eighty thalers. This manuscript, or copies of it, must in all probability have been known to the Chancellor Kortholt, so that it must have been in existence about 1680. All other editions are later, and we have no certain indication of the earlier existence of the MS. Internal grounds lead us to suppose that it first appeared in the second half of the seventeenth century. The very outset of the book (Esse Deum, eumque colendum esse) seems to contain a clear reference to Herbert of Cherbury; besides, it is impossible, as was noticed by Reimann, not to recognise the influence of Hobbes. The mention of the Brahmans, Vedas, Chinese, and the Great Mogul, betrays a knowledge of the books which opened the study of Hindoo and Chinese literature and mythology, and led to the comparison of religions; namely, the works of Rogerius, "Indisches Heidenthum," Amsterdam, 1651, German, Nürnberg, 1663; Baldaeus, "Malabar, Coromandel, and Zeylon," Amsterdam, 1672, Dutch and German; and Alexander Ross, "A View of all Religions," Lond., 1653, of which there were three German translations. Moreover the work, although first printed in Germany, appears to be by no means of German origin, for the Gallicism "sortitus est," which is to

more probably a product of that time in which the Chancellor Kortholt endeavoured to turn the enemies' weapons against themselves. How productive that time was in such, for the most part, forgotten freethinking experiments, is shown by the notice that the Chancellor Mosheim (*ob.* 1755) possessed no less than seven manuscripts of this kind, all of which were written in the period after Descartes and Spinoza, and therefore, also, after Herbert and Hobbes.[47]

But the English influence was shown with especial clearness in a little book which belongs completely to the history of Materialism, and which we are glad to discuss here with some fulness, because it has not been properly estimated by the most recent historians of literature, and can scarcely have been very well known to most of them.

This is the "Correspondence on the Nature of the Soul," which in its time caused so much discussion, and which from 1713 appeared in a series of editions, was attacked in replies and reviews, and even induced a professor at Jena to devote a special lecture to the confutation of the tiny book.[48] It consists of three letters, which profess to be written by two different authors, to which a preface of some length is added by a third, who in the edition of 1723 entitles this the fourth edition, and in passing gives expression to the general surprise that the earlier editions had not been confiscated.[49] Weller, in his "Dictionary

be found in the earlier MSS. (so too in Genthe; corrected in later editions and MSS. into "egressus est"), betrays a French author or a French original.

[47] Comp. Mosheim's Geschichte der Feinde der christl. Religion, edited by Winkler, Dresden, 1783, p. 160.

[48] "Prof. Syrbius zu Jena hat nach des Bücher Saals 28. Ordnung ein Collegium wider den Brieff.-W. v. Wesen d. Seele gehalten und dessen Autori darin seine Abfertigung geben wollen" (Vorrede). Comp. further the German "Acta Eruditorum," x. Theil, No. 7, pp. 862–881; Unschuldige Nachrichten, 1 anno 1731, No. 23, p. 155, *et saepe.*

[49] For the first edition of the "History of Materialism," I used a copy from the library at Bonn of the year 1723; at present I avail myself of a copy of the first edition of 1713, obtained from the duplicates of the town library of Zürich. I have for the sake of simplicity left the passages cited verbatim in the text unchanged, so that they represent the edition of 1723 where the contrary is not expressly said. More particular references to the page may be dispensed with in the case of so small a book, yet we have added a more precise indication of the place for all that is taken from the first edition.

of Pseudonyms," names J. C. Westphal, a surgeon in Delitzch, and J. D. Hocheisel (Hocheisen, attached to the Philosophical Faculty at Wittenberg ?), as the authors of this correspondence. In the last century, strangely enough, the two theologians Röschel and Bucher were regarded as the authors, the latter of whom was passionately orthodox, and was certainly not the man to have entered into correspondence with an 'Atheist'—as at that time were styled even Cartesians, Spinozists, Deists, and so on. Röschel, who was also a physicist, if we rely on internal grounds, might well have written the second (anti-materialistic) letter. But in that case it remains very doubtful who was the Materialist—the author of the first and third letter, if not of the whole book.[50] The treatise, corresponding to the melancholy time of its production, is written in a horrible style—German intermingled with fragments of Latin and French, and betrays a witty spirit and thoroughness of thought. The same ideas in a classic form and amongst a self-sufficient people would perhaps have created a sensation like that produced by the writings of Voltaire; but the form indicates here the zero-point of German prose. The time when it was written was a time in which all the more eminent freethinkers drew their wisdom from the Frenchman Bayle, and after a few eagerly read editions; the voice of the German died away. The author was himself quite conscious of this position of affairs, for he observes: "Dass ich diese Briefe teutsch concipiret, solches wird man nicht vor übel halten, weil ich sie nicht Aeternitati gewidmet wissen wollte." ("That I have written these letters in German will not be taken amiss, because I have not supposed that they were written Aeternitati.") The author had read Hobbes, but, as he says, "for another purpose;" of the French illuminati he could as yet know nothing.[51] In 1713, the

[50] In my copy—comp. the previous note—appears a note from an unknown hand, "Von Hocheisser (*sic*) und Röschel."

[51] Hobbes, whose influence upon the whole work cannot be mistaken, is often quoted; thus in the "Lustigen Vorrede" of an anonymous writer,

date of the book's appearance, Diderot was born, and Voltaire found his way, as a young man of nineteen, for the first time, because of some satirical poems against the Government, into the Bastille. After the editor in his introduction to the letters has proved the erroneousness of all the earlier philosophies, including the Cartesian, and has shown how physics have recently extorted the first place from metaphysics, he considers the general controversy, whether we shall strike all new ideas to the ground with the old outgrown authority or refute them.

"Etliche* rathen, man solle sich juxta captum vulgi erronei richten und Peter Squentzen mit spielen. Andere aber protestiren Sollenniter, und wollen par tout Märtyrer vor ihre eingebildete Wahrheiten werden. Ich bin zu ungeschickt, das Wagezünglein in dieser Controvers zu sein; doch meinem Bedünken nach schiene es probabel, dass durch tägliche Abmahnung der gemeine Mann allgemach würde klüger werden; denn nicht vi, sed saepe cadendo (Experientia teste) cavat gutta lapidem; dabei ich auch nicht leugnen kann, dass die praejudicia nicht

* [As it is impossible to reproduce in English the singular style of this early attempt at German prose-writing, it seems better to print the extracts in their original shape, and to give a full analysis in a note. —Tr.]

Some recommend us to range ourselves juxta captum vulgi erronei; while others insist partout upon being martyrs to what they imagine to be truth. I am not clever enough to decide this controversy, but it seems to me probable that the ordinary man would gradually become wiser: at the

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as it is expressed in the first edition, p. 11, where we are referred to the "Leviathan" and the Supplement to it; in the first letter, p. 18, in the following words: "Hieraus siehet man, dass die Meinung nicht neu und ungewöhnlich, da sie zumahl viel Engelländer profitiren sollen (von denen ich aber noch keinen, ausser dem Hobbesio, doch in einer andern Intention gelesen habe);" in the second letter, pp. 55, 56; in the third, p. 84. Locke is mentioned in the second letter, p. 58; besides, there is in the third letter, p. 70, the thought, obviously owing its origin to Locke: "Ich hielte es für unchristlich, wenn man Gott nicht so viel zutrauen wollte, dass aus der zusammengefügten Materie unseres Leibes ein dergleichen Effect folgen könnte, der die Menschen von andern Geschöpfen unterschiede." The 'Mechanismus' of the English in general is frequently spoken of. Spinoza is regarded as an Atheist and coupled with Strato of Lampsacus, pp. 42, 50, 76. At p. 44 the "forts esprits" of France are mentioned "nach des Blaigny relation in Zodiaco Gallico."

nur beim Laico, sondern auch wohl bei den sogenannten Gelehrten ziemlich schwer wiegen, und sollte es noch viele Mühe kosten, diese tief eingefressene Wurzel aus der Leute Köpffen zu graben, weil das Pythagorishe αὐτὸς ἔφα ein zum Faullentzen herrliches Mittel, ja ein vortrefflicher Mantel, womit mancher Philosophus den Ignoranten bis auf die Klauen bedecken kann. Sed manum de tabula. Genug ist's, dass wir in allen unsern Actionibus hessliche, ja sclavische Praejudicia Autoritatis hegen.

"Dass ich aber unter tausenden eines erwehne, so kann es unsere Seele sein. Was hat das gute Mensch nicht schon für Fata gehabt, wie offt hat sie müssen in dem menschlichen Leibe herum marschieren. Und wie viel wunderliche judicia von ihrem Wesen haben sich in der Welt ausgebreitet. Bald setzet sie einer in Cerebrum, da setzen sie ihm viele andere nach. Bald setzet sie einer in die glandulam pinealem, und dem folgen auch nicht wenige. Wieder andern scheint dieser Sitz zu enge, und gar recht. Sie könnte nicht, wie sie, bei einer Kanne Coffée l'ombre spielen. Darum postieren sie sie in quamvis Corporis partem gantz, und in toto Corpore gantz: und ob gleich die Vernunft leicht begreifft, dass so viele Seelen in einem Menschen sein müssten, als Puncta an ihm sind, so finden sich doch viel Affen, die es auch so machen, quia αὐτός, ihr seliger Herr Präceptor, der 75 Jahr alt, und 20 Jahr Rector Scholae dignissimus, diss vor die probabelste Sentenz hielt.

"Noch andre setzen sie ins Hertze und lassensie sich im

same time I see that prejudice is very strong not only with laymen but also with the so-called learned, and that it will cost much trouble to eradicate it, since the Pythagorean ipse dixit is an admirable cloak wherewith many a philosopher can hide his ignorance.

To take one case among a thousand, that of our Soul. What vicissitudes has this poor creature already endured—wandering all through the human body. One places it in cerebrum, and has a multitude of followers; another sets it in the glandulam pinealem, and finds no few supporters. To others again this seems too narrow an abode, and they make it exist wholly in quamvis corporis partem, and wholly in toto corpore: and although reason says that there must then be as many souls in a man's body as there are points in it, yet there are many apes ready to follow their worthy Herr

Blute herum schwemmen; bei andern muss sie ins Ventriculum kriechen; ja bei einem andern muss sie gar ein barmhertziger Thürhüter des unruhigen Hinter-Castells abgeben, wie die Aspectio der Bücher sattsam zeiget.

"Noch thümmer aber ist's wenn sie von dem Wesen der Seele reden; ich mag nicht sagen, was ich vor Gedanken habe, wenn ich die unreiffe Geburt beym Herrn Comenio, salvo honore, Orbe picto aus lauter Puncten bestehend sehe, ich danke Gott, dass ich nicht mit spiele, und so viel Unrath im Leibe habe."

Dr. Aristotle himself would in the "examen rigorosum Baccalaureale" not know how his Entelechy was to be explained, and Hermolaus Barbarus would not know whether to translate his rectihabea by a Berlin night lantern or a Leipzig watchman's rattle. Others, who will not pollute their consciences by the use of the heathen word *ἐντελέχεια*, make the soul, in order that they may say something, a "qualitas occulta." "Weil* nun ihre Seele eine qualitas occulta, so wollen wir ihnen selbe occultam lassen, weil ihre Definition nicht zu verachten, massen sie die Kraft hat, sich selbst zu refutieren.

"Wir wenden uns vielmehr zu denen die Christlicher zu reden und mit der Bibel einzustimmen gedenken. Bei diesen geistreichen Leuten nun heisst die Seele ein Geist. Das heisst, die Seele heisst etwas, was wir nicht wissen, oder was vielleicht nichts ist?"

Professor, who is seventy-five years old, and has for twenty years been Rector Scholae dignissimus.

Others again place it in the heart, and make it circulate with the blood: others pin it into the ventriculum; another even makes it a pitiful door-keeper in the unruly.

Still worse is it when they speak of the return of the soul: I could rather not say what I think of the abortion of Comenius, and I thank God that I have, at least, had nothing so absurd about me.

* As their soul is a qualitas occulta, we will leave it occultam, for their definition is not to be despised since it has strength enough to refute itself.

We turn rather to those who think that they are better Christians, and are in agreement with the Bible. These clever people call the soul a spirit. That is to say, the soul is Something that we do not know, or that perhaps is nothing at all.

The materialistic author of the first letter gives us a circumstantial account of how he came upon his train of thought. Because he saw that the physiologists, and with them the philosophers, thrust the more complicated functions of man upon the soul, as though one need not hesitate to credit it with every capability, he began in order to get behind the nature of such functions to compare the actions of animals with those of men. "Da nun,"* he says, "die Aehnlichkeit in denen affectionibus animalium et brutorum etliche neue Philosophos auf die Meinung gebracht, dass die bruta gleichfalls eine animam immaterialem hätten, so gerieth ich auf den Gedanken, dass, da die neuen Philosophen zu diesem Entschluss gekommen sind, die alten aber ohne dergleichen Seele die actiones brutorum expliciret hätten, ob es nicht auch angehen könnte, dass man die actiones hominis ohne einige Seele zu werke richten könne." He shows then that at bottom scarcely any of the ancient philosophers held the soul for an immaterial substance in our sense: the forma of the Aristotelian philosophy being defined by Melanchthon quite rightly as ipsam rei exaedificationem, which Cicero conceived as a continual motion (ἐνδελέχεια), "which motion follows from the organisation of the body, and is thus an essential part hominis viventis, and separated, not realiter, but only in mente concipientis." Even the Bible, the Christian fathers, and various sects are adduced. Among others a thesis of the Anabaptists printed at Cracow in 1568: "We deny that any soul continues to exist after death." His own views are of the following nature:—

The functions of the soul, insight and will, which are usually called inorganic (that is not organic), are based upon sensation. The "processus intelligendi" is as fol-

* As the similarity in the affectionibus animalium et brutorum led some modern Philosophos to the opinion that the bruta also have an animam immaterialem, so I came upon the idea, whether as the old philosophers had explained the actiones brutorum without any soul, it might not be possible *to set going the actiones hominis without any soul.*

lows: "Wenn das organum sensus, sonderlich visus und auditus auf das objectum gerichtet wird, so geschehen unterschiedne Bewegungen in denen fibris cerebri"—(when the sense organ, especially that of sight or hearing, is directed to the object, there occur various movements in the fibris cerebri), which all have their termination in a sense organ. This motion in the brain is identical with that in which rays fall upon the table of a camera obscura and form a certain picture, since indeed that picture is in reality not upon the table but is caused in the eye. Now as the fibres of the retina are excited, this motion is continued in the brain and forms there the idea. The combination of these ideas, however, is brought about by motion of the fine brain fibres, in the same way in which a word is formed through the movements of the tongue. And this origin of the ideas validates the principle: nihil est in intellectu, quod non prius fuerit in sensu. A man would know nothing if his brain fibres were not properly stimulated by the senses. And this occurs through education, practice, and habituation. As the man in his external members exhibits a certain similarity with his parents, we must imagine a like condition with regard to the internal parts.

The author, who often makes himself unreservedly merry over the Theologian, yet, for all his completely materialistic notions of man, takes care not to come into too sharp conflict with Theology. He absolutely refrains himself, therefore, from speculations on the universe and its relation to God. As he openly enough rejects in various places the notion of an immaterial substance, it involves a contradiction that he did not provide for an extension of his principle to the whole of nature. But whether this be a real inconsistency, or whether he is acting on the principle of *gutta cavat lapidem*, we do not know. In his theological views he nominally follows the English Cudworth—that is, he supposes that at the day of judgment there will be a resurrection of the soul together with the body, in order

to accommodate himself to the Church's faith. And so he explains God to be the contriver of a perfect construction of the brain in the first man, that through the Fall was injured just as when one loses his memory through an illness.

The decision of the will in action always follows the stronger motive, and the doctrine of the freedom of the will is entirely useless. The motives influencing the will may be reduced to the passions and the law. We might perhaps suppose that so many movements in the brain must necessarily lead to confusion, but let us only reflect how many aether rays must intersect each other in order to convey the image of things to us, and how, nevertheless, the proper rays always find each other. If our tongues can pronounce innumerable words and form innumerable expressions, why may not the brain fibres produce still more movements? That everything depends upon these, we see in particular from the case of delirium. So long as the blood is agitated, and the fibres accordingly are moved unequally and confusedly, the delirium persists; if, however, such a confused movement arises without fever, then madness is developed. That delusions can, in fact, be introduced through the blood, is proved by hydrophobia, the bite of the tarantula, and so on.

Another kind of mental disease is *ignorance*, which must be cured by education, teaching, and discipline. "This education and teaching is the right soul of man. which constitutes him a reasonable creature" (p. 25, 1st edition). In another place (p. 39) the writer suggests that those who distinguish three parts in man, namely, Spirit, Soul, and Body, would do best, if by 'spirit' they were to understand the education that is received, but by 'soul' the aptudinem omnium membrorum corporis nostri, especially fibrarum cerebri, in a word, facultatem.

At some length the author attempts to effect a reconciliation with the Bible, although the affectation of orthodoxy is often enough interrupted by malicious and ironical

remarks. The theory underlying this first letter leans indeed strongly on the side of that ancient materialistic turn of the Aristotelian theory, which makes the form a property of the matter. And accordingly the author is fond of quoting Strato and Dikaearchos, although it be with a protest against their Atheism; but he is especially delighted with Melanchthon's definition of the soul, and repeatedly recurs to it. The explanation of the soul or the spirit, as the result of education, is in one place (p. 35 of the first edition) expressly referred to Averroes and Themistius; but it is easily seen that the Platonising Pantheism of Averroes is here transformed into Materialism. With Averroes, it is true, the immortal reason is in all men one and the same substance, and is identical with the objective content of knowledge; but this identification of the mind and of its content rests upon the doctrine of the identity of thought with real being, which, as divine and constitutive reason, has its real existence outside the individual, and only shines in upon the individual like a ray of light from heaven. But in the present case the education is a material influence of spoken words upon the brain. This, in fact, does not look like an unintentional 'dilution' of the Aristotelian theory, but like a conscious modification of it in a materialistic sense.

In the third letter the author expresses himself as follows:—"Dass* ich die Animam hominis vor ein materielles Wesen hätte halten sollen, darzu habe ich niemalen können gebracht werden, ob ich gleich viele Disputes deswegen mit angehöret. Ich konnte niemahls begreiffen, was vor Vortheil die Physic in hac materia durch Annehmung dieser Opinion hätte; am allerwenigsten aber wolte es sich in meinem Kopfe reimen, dass da gleichwohl die an-

* I have never been induced to hold the soul to be a material thing, in spite of much controversy. I could never understand what advantage there was to physical science in holding this opinion; least of all could I understand why, when the other animals are so constructed that we attribute the effects we see in their case to the matter adapted by God to the purpose, man alone may not boast of this distinction, but must be considered quite iners, mortuus, inefficax, and so on; so that it is necessary to *insert some-*

dern Geschöpfe also erschaffen, dass man den Effect, den sie von sich spüren lassen ihrer von Gott darzu adaptirten Materie zuschreibet, der Mensch allein dieser Wohlthat sich nicht zu rühmen, sondern ganz iners, mortuus, inefficax u. s. f. sey, und dass man noch nöthig habe, etwas in den Menschen hinein zu stecken, welches nicht nur die Actiones, die den Menschen von andern Geschöpfen unterscheiden, zu verrichten capable wäre, sondern auch sogar das Leben mittheilen müsste."

Nevertheless, the author thinks it advisable to defend himself against the reproach that he is a 'Mechanicus,' *i.e.*, a Materialist. "Ich rede von keinem andern Mechanismo oder Dispositione materiae, als demjenigen, der die formas Peripateticorum einführet; und zwar, damit es nicht scheinet, als wenn ich eine neue Philosophie aushecken wollte, so will ich mich hier lieber des Praejudicii autoritatis beschuldigen lassen, und bekennen, dass mich Melanchthon (!) dazu bewogen hat, welcher sich des Wortes exaedificationis materiae (zur Erklärung der Form, d. h. für den Menschen der Seele) bedienet." Now, when we come to consider more clearly the Aristotelian standpoint, it is very easy to see that the expression 'exaedificatio materiae,' or more exactly 'ipsius rei exaedificatio,' leaves it still quite undetermined whether the formative force comes from the material, or whether it must be attributed to the form as a special, higher, and self-existent principle, that might in that case be very well designated "soul." Here the writer has, it is obvious, wished either to intrench himself behind the authority of Melanchthon, or to imitate the theologians; perhaps both. That he is not quite serious in his whole Peripatetic position seems to be shown by the

thing into the man that may be able merely to supply those actions that distinguish man from other creatures, but even to supply him with life. . . . I speak of no other mechanism or disposition of matter than that which introduces the formas Peripateticorum; and, in fact, that I may not seem to be introducing a new philosophy, I will rather incur the blame of the Praejudicii autoritatis, and admit that I have followed Melanchthon, who avails himself of the phrase Exaedificatio materiae (for the explanation of the form, that is, the man of the soul).

difficulties that he immediately afterwards finds in the explanation of the forms, and which finally drive him to take refuge in these "Atomis Democriti," which he regards as preserving the forms of all material bodies.[52] A similar hide-and-seek procedure seems also to consist in this, that the ostensible opponent of Materialism in the second letter attempts to convict the writer of the first of atheistic conclusions. It is not impossible that this is a mere ruse in the manner of Bayle, in order to guide the reader towards these conclusions; and this, again, would be another argument that the whole work proceeded from one and the same pen.

The remarkable treatise which we have just discussed the more deserved attention in that it by no means stands alone as a monument of German intellectual struggle, and as a proof that modern Materialism (apart from Gassendi) is older in Germany than in France. Who knows anything now of the honest doctor, Pancratius Wolff, who as early as 1697, as he says himself, in his "Cogitationibus Medico-Legalibus," submitted to the judgment and opinion of the learned world, "that the thoughts are not actiones of the immaterial Soul, but are Mechanismi of the human Body, and in specie of the Brain." In 1726 Wolff, who in the meantime can have had anything but a very plea-

[52] The word 'not' had here fallen out in the first edition. Meantime, on a repeated perusal of the "confidential correspondence," I have changed my opinion, and think now that the author, in his philosophical as well as his theological orthodoxy, plays a double game, since on the one hand he guards himself in all events, and on the other he is obviously jesting. It is possible, indeed, that we have here an *extension* of the fusion (mentioned by Zeller after Leibniz) of Atomism, with a modification of the doctrine of the 'forma substantialis' (comp. above, Note 42); yet still as nothing but a general foundation upon which the author moves with great subjective freedom. Moreover, that the atoms as 'conservatores specierum'—that is, preservers of the *forms* and the *species*—are not Demokritean, but Epikurean, must be sufficiently clear from our account in the First Section, since Epikuros connects the maintenance of definite forms of nature with the *finite* number of the different kinds of atom. Here, indeed, as often, Demokritos was probably followed instead of Epikuros, not only because in him is found the fundamental idea of Atomism, but also because his name was less of a stumbling-block.

sant time of it, published a pamphlet, in which he sets out his old view, "freed from all the unchristian conclusions that thereby the special providence of God, the liberum Arbitrium, and all morality, were denied." Wolff had attained his views through his own observations in the delirium of fever, and so in much the same way as De la Mettrie.

Even the celebrated Leipzig professor of medicine, Michael Ettmüller, is said to have "established a material soul," yet in such a way that its immortality was by no means denied. Ettmüller was the head of the iatro-chemical school, and this circumstance alone will scarcely allow us to consider him as a Materialist in our sense of the term. It is clear, however, that medical men as early as the end of the seventeenth and beginning of the eighteenth century, long before the spread of French Materialism, were beginning to emancipate themselves from the theological and Aristotelian notions as to the soul, and to follow their own ideas. It is certain that much was condemned as Materialism by the champions of the orthodox view that cannot be so included. On the other side, however, we must not fail to observe that a distinct course of development leads medicine and the natural sciences towards consistent Materialism, and therefore these transitional standpoints also deserve the most careful consideration in a history of Materialism. But at present there are still everywhere lacking the necessary materials.[53]

[53] Here one sees how the fact that historical treatises rest upon original authorities is nevertheless no guarantee for the correct, or even the complete, characterisation of an epoch. It only too easily becomes a habit to take always the same once-cited authorities, and what has once been forgotten becomes more and more thoroughly forgotten. A valuable protection against this one-sidedness is provided, so far as they extend, by periodicals. I remember that I first stumbled upon the "Confidential Correspondence," as well as upon Pancratius Wolff, while I was searching for reviews and other traces of the influence of "L'Homme Machine" in Germany. Generally speaking, indeed, in the history of German intellectual life, the period from about 1680–1740 seems still to contain many important gaps.

CHAPTER II.

DE LA METTRIE.

JULIEN OFFRAY DE LA METTRIE, or simply Lamettrie, as it is commonly written, is one of the most abused, but one of the least read, authors in the history of literature—an author known even superficially to but few of those who thought proper to abuse him when it suited them. This traditional treatment dates even from the circles of his contemporaries, not to say of those who shared his opinions. Lamettrie was the scapegoat of French Materialism in the eighteenth century. Whoever came into unfriendly contact with Materialism attacked him as its extremest representative; and even those who approached to Materialism in their own views, protected their own backs against the worst reproaches by giving Lamettrie a kick. And this was the more convenient, as Lamettrie was not only the extremest of the French Materialists, but was the first also in point of time. The scandal was therefore doubly great, and for several decades men could with virtuous indignation condemn this sinner, while they were gradually absorbing his ideas; later, too, they could with impunity sell as their own manufacture what they had learned from Lamettrie—because they had separated themselves from him with a unanimity and an energy that quite set at fault the judgment of their contemporaries.

Let us first of all bring order into the chronology! Hegel's initiative in the history of philosophy we have to thank for the inheritance of his innumerable arbitrarinesses. Of 'mistakes,' at least in the majority of cases,

there can be no suggestion; for Hegel, as everybody knows, constructed the true succession of the notions out of the principle, and washed his hands in innocency if Nature had committed the oversight of letting a man or a book come into the world some years too early or too late. His school has followed him in this; and even men who no longer approve of this violent procedure yet remain under the influence of its consequences. Thus we are indebted, for example, to Zeller for the conscious elimination of nearly all these contempts of chronology from the history of Greek philosophy; and in his 'History of German Philosophy since Leibniz,' there is everywhere conspicuous the effort to do justice to the actual course of things. But where he refers incidentally to the French Materialism, this appears nevertheless, in spite of all the cautiousness of the expression, simply as a consequence of the 'Sensationalism' which Condillac developed from the Lockean 'Empiricism.' But Zeller points out at least in passing that Lamettrie drew this consequence even *before the middle* of the century.[54] The usual plan is this,

[54] Comp. Zeller, Gesch. d. deutschen Philos. seit Leibnitz, München, 1873, S. 304 and 396 ff. Expressions like: "Ebensowenig thut Condillac *schon* den Schritt vom Sensualismus zum Materialismus;" "Weiter ging Helvetius, . . . bei ihm hat der Sensualismus *schon* eine unverkennbare Neigung zum Materialismus" (S. 397); and again: "*Noch stärker* tritt diese Denkweise bei einem *Lamettrie*, einem Diderot und Holbach hervor," will involuntarily be understood by the reader as referring to a chronological series, and thus, at least with regard to Lamettrie, an erroneous conception is immediately given of his position in the history of philosophy. For the rest, the whole of Hegel's view of this succession is, even from the standpoint of logical consequence, totally false. In France, the advance from Condillac to Holbach is simply explained by this, that Materialism, as the *more popular* standpoint, afforded a more effective weapon against religious belief. It was not *because* philosophy advanced from Sensationalism to Materialism that France became revolutionary, but because France (through deeper causes) became revolutionary, the philosophers of the Opposition ever seized upon *simpler* (*more primitive*) standpoints; and Naigeon, who abridges the writings of Holbach and Diderot, is at last the true man of the time. In the unhampered theoretical development Empiricism (*e.g.*, Bacon) leads first to Materialism (Hobbes), this to Sensationalism (Locke), and from this are developed Idealism (Berkeley), and Scepticism or Criticism (Hume and Kant). This

that Hobbes, one of the most influential and original of modern thinkers, is entirely passed over, is referred to the history of political science, or is regarded as a mere echo of Bacon. Then Locke, who popularises 'Hobbism' for his own age, and rounds off his corners, appears as the original progenitor of a double line of development, an English and a French one. In this latter there succeed each other on the string of the system Voltaire, Condillac, the Encyclopædists, Helvetius, and finally Lamettrie and Holbach. This order of succession has become so familiar, that Kuno Fischer once indeed, in passing, makes Lamettrie a disciple of Holbach![55] This kind of thing extends its influence far beyond the limits of the history of philosophy. Hettner forgets his own chronological data when he maintains that Lamettrie, instigated chiefly by Diderot's 'Pensées Philosophiques,' wrote in 1745 the 'Histoire Naturelle de l'Ame,' and in 1748 'L'Homme Machine;' and in Schlosser's 'History of the World' we may read that Lamettrie was a very ignorant man, who had the impudence to pass off the discoveries and observations of others as his own.[56] Only that in nearly every case where we find a striking similarity of ideas between Lamettrie and any famous contemporary of his, the former had an indisputable priority!

will hold still more decidedly for the future, since even the men of science have accustomed themselves to see that the senses give us only a 'Welt als Vorstellung.' Nevertheless this order of succession may at any moment be disturbed by the practical influence above mentioned; and in the greatest revolutions, of whose inner causes, buried deep in 'consciousness,' we as yet know scarcely anything but the *economic* side, even Materialism is at last not sufficiently popular and trenchant, and myth appears against myth, creed against creed.

[55] Kuno Fischer, Franz Baco von Verulam, Leipzig, 1856, S. 426, E. T., p. 453: "It was Condillac who systematically carried out the principles of Locke, . . . leaving only one result possible — Materialism in its most naked form. Condillac was followed by the Encyclopædists; and his Materialism was further elaborated by the Holbachians, represented by Lamettrie and the 'Système de la Nature.'"

[56] Hettner, ii. S. 388 (instead of 1748, the date of 'L'Homme Machine' is given erroneously as 1746). Schlosser's Weltgesch. f. d. deutsche Volk, xvi. (1854), S. 145.

Lamettrie was, in point of age, to begin with, one of the oldest among the authors of the French Illumination. Except Montesquieu and Voltaire, who belong to an earlier generation, nearly all are younger than he. Buffon, Lamettrie, Rousseau, Diderot, Helvetius, Condillac, D'Alembert, follow each other in this order, and at brief intervals, from 1707 to 1717; Holbach was not born till 1723. When the last-named gathered together in his hospitable house that circle of able free-thinkers which now always passes under his name, Lamettrie had long ceased to be numbered with the living. Moreover, as an *author*, especially with regard to the questions with which we are concerned, Lamettrie stands at the commencement of the whole series. Buffon began the publication of his great work on natural history in the year 1749, with the first three volumes; but it was only in the fourth volume that he unfolded the idea of the unity of principle in the multiplicity of organisms, an idea which occurs again in Maupertuis in an anonymous work in 1751, in Diderot in the 'Pensées sur l'Interprétation de la Nature,' 1754,[57] while we find it developed with great clearness and distinctness by Lamettrie as early as the 'L'Homme Plante' in 1748. Lamettrie was led to write this treatise by Linné's just published pioneering work on the classification of plants (1747), just as we find in all his writings constant traces of the zealous following up of the newest scientific investigations. Lamettrie cites Linné; none of the later writers think it necessary to cite Lamettrie, although there can be no doubt that they had read him. Whoever swims with the stream of tradition and neglects the chronology, will of course represent the 'ignorant' Lamettrie as decking himself with borrowed plumes!

Rosenkranz, in his work on Diderot,* gives incidentally what is in the main a correct account of the life and writings of Lamettrie. He mentions even the 'Natural History of

[57] Comp. Rosenkranz, Diderot, i. S. 136. * Rosenkranz, ii. 65 ff.

the Soul' of the year 1745. This does not prevent him, however, from declaring the Lockean Sensationalism, "as it was introduced by Condillac from Paris into France," to be "the starting-point of the principles of French Materialism;" and then immediately follows the statement that Condillac's first work appeared in 1746. The starting-point, therefore, appears later than the last consequence; for in the 'Natural History of the Soul,' the Materialism is covered only by a very transparent veil. In the same work we find an idea which in all probability afforded the suggestion for Condillac's sensitive statue.

So much for the present as tribute to truth! That the true connection could so long be misrepresented is, next to the influence of Hegel and his school, chiefly to be attributed to the resentment excited by Lamettrie's attack upon the Christian morality. People forgot, in consequence, his theoretical writings; and the calmest and most serious of them, including the 'Natural History of the Soul,' were most completely forgotten. Many of the censures passed upon Lamettrie, as man and author, applied strictly only to his ethical writings. Those forgotten books are by no means so empty and superficial as is commonly imagined; but it is true that Lamettrie, especially in the last years of his life, made the struggle against the fetters of morality a very special subject of his efforts. This circumstance, combined with the provoking deliberateness with which, even in the title of his chief work, he represents man as a 'machine,' has probably chiefly contributed to make a bugbear of the name of Lamettrie, in whom the most tolerant writers will recognise no favourable trait, and whose relation to Frederick the Great is considered as particularly scandalous. And yet Lamettrie, in spite of his cynical treatise on lust, and in spite of his death through immoderate indulgence in a pasty, was, as we shall see, a nobler nature than Voltaire and Rousseau; much weaker, it is true indeed, than these ambiguous heroes,

whose fermenting influence moved the whole eighteenth century, while Lamettrie's activity remained limited to a much narrower sphere.

Lamettrie might then, perhaps, be called the Aristippos of modern Materialism; but the lust which he represents as the end of life is related to Aristippos's ideal, as is a statue of Poussin to the Venus de Medici. His most notorious productions have neither great sensuous energy nor seductive fervour, and appear as if artificially manufactured in pursuance of a once-adopted principle. Frederick the Great ascribes to him, certainly not wholly without ground, an imperturbable natural gaiety, and eulogises him as a pure soul and an honourable character. Nevertheless the reproach of frivolousness will always cling to this character. As a friend, he may have been obliging and self-sacrificing; as an enemy, he was, as Albrecht von Haller in particular had to experience, malicious and low in the choice of his means.[58]

Lamettrie was born at St. Malo, the 25th December 1709.[59] His father carried on a business that placed him in a position to give his son a good education. Upon finishing his preparatory studies, this son so distinguished himself that he carried off all the prizes. His talents were especially rhetorical and poetical. He was passionately fond of polite literature; but his father reflected that a clergyman makes a much better living than a poet, and he destined him for the service of the Church. He was sent to Paris, where he studied logic under a Jansenist professor, and so thoroughly studied himself into his teacher's views, that he himself became a zealous Jansenist. He is even said to have written a book which gained the approbation of this party. Whether he also adopted the mystical asceticism, and inclination to pietistic mortifica-

[58] Comp. Zimmermann, Leben des Herrn von Haller, Zurich, 1855, S. 226 ff.

[59] In the biographical details we follow, here and there literally, the Éloge of M. De la Mettrie, composed by Frederick the Great, in the Histoire de l'Academie Royale des Sciences et Belles Lettres, Année 1750, Berlin, 1752, 4to, pp. 3–8.

tion, by which the Jansenists were distinguished, we are not told. At all events, this tendency cannot have lasted, in his case, for any considerable time.

While on a visit to his native town of St. Malo, a doctor of the place excited in him a taste for the study of medicine, and he succeeded in persuading his father "that a good prescription is still more profitable than an absolution." With great zeal the young Lamettrie threw himself into physics and anatomy, graduated at Rheims, and practised as a doctor for some time, until, in the year 1733, attracted by the fame of the great Boerhaave, he went to Leyden to resume his studies.

There was at that time collected round Boerhaave, although he had already ceased to lecture, a distinguished school of zealous young doctors. The University of Leyden formed at that time a centre of medical studies, such as perhaps has never been seen again. Around Boerhaave himself flocked his disciples with an unbounded reverence. This man's great reputation had acquired him considerable riches, amidst which he lived so plainly and simply that only his great benevolence and liberality gave evidence of them. In addition to his eminent gifts as a teacher, he was eulogised in particular for his character, and indeed his piety, although he had at one time incurred the imputation of atheism, and had scarcely ever changed his theoretical views. For Boerhaave too, like Lamettrie, had begun with the theological career, which he had been compelled to abandon because of his unconcealed adhesion to the philosophy of Spinoza; for Spinozism was to the theologians the same thing as Atheism.

The serious and thoroughly solid spirit of the great master, in devoting itself to medicine, had been far from seeking to enter into controversy with the representatives of other principles on the ground of his naturalistic philosophy. He was contented with his work and activity; but at the same time his whole influence cannot but have favoured the spread of materialistic views among his pupils.

France was at that time, in comparison with England, the Netherlands, and Germany, decidedly backward in medicine. Lamettrie therefore undertook a series of translations of Boerhaave's works, in order to prepare the way for a better system; some writings of his own followed, and he was speedily entangled in bitter animosities with the ignorant authorities of Paris. Meanwhile he was practising with great success in his native town, unremittingly engaged at the same time with medical literature. The positive spirit of his teacher did not soon relax; and although his sanguine restlessness had already brought medical controversies enough upon him, yet he still left philosophy at rest.

In the year 1742 he went to Paris, and by means of influential recommendations he received there a position as surgeon to the Guard. In this capacity he made a campaign in Germany, and this campaign determined his whole future course. For he was seized by a violent fever, and used this opportunity in order to institute observations upon himself as to the influence of quickened circulation upon thought. He came to the conclusion that thought is nothing but a consequence of the organisation of our mechanism. Filled with this idea, he tried during his convalescence to explain the mental functions by the help of anatomy, and he had his conjectures printed under the title of a 'Natural History of the Soul.' The regimental chaplain sounded the alarm, and soon a universal cry of indignation was raised against him. His books were recognised as heretical, and he could no longer continue to be surgeon of the Guard. Unhappily, he had allowed himself, about the same time, in order to help a friend who wished to be made surgeon to the King, to be persuaded into writing a satire on his rivals, the foremost Paris practitioners. Aristocratic friends advised him to avoid the universal cry for vengeance, and he fled in the year 1746 to Leyden. Here he wrote immediately a new satire upon the charlatanism and ignorance of

doctors, and soon afterwards (1748) appeared also his 'Homme Machine.'[60]

The 'Natural History of the Soul'[61] begins by showing that as yet no philosopher, from Aristotle down to Malebranche, had been able to account for the nature of the soul. The nature of the soul of man and of the animals will always remain as unknown as the nature of matter and of bodies. Soul without body is like matter without any form: it cannot be conceived. Soul and body have been formed together, and in the same instant. He who wishes to learn the qualities of the soul must previously study those of the body, whose active principle the soul is.

Our consideration of the subject leads to this conclusion, that there is no safer guide than the senses—"they are my philosophers." However much we may revile them, we must always come back to them if we wish seriously to discover the truth. Let us therefore inquire fairly and impartially what our senses can discover in matter, in bodies, and especially in organisms, but without seeing anything that is not there! Matter is in itself passive: it has only a power of inertia. Wherever, then, we see motion,

[60] In the first edition the date of publication of 'Homme Machine' was given as 1747 (end), following Zimmerman, Leben des Herrn von Haller, S. 226. Quérard, 'France Littéraire' (the fullest and most accurate, although still not complete, enumeration of Lamettrie's works), gives the year 1748. For the rest, Lamettrie, according to the Éloge of Frederick the Great, went to Berlin as early as February 1748.

[61] In Lamettrie's philosophical works, under the altered title, 'Traité de l'Ame.' That this work is identical with the 'Histoire Naturelle' is shown *inter alia* by an observation of the author's, chap. xv. of the Histoire, vi. of the Traité: "On parlait beaucoup à Paris, quand j'y publiai la première édition de cet ouvrage, d'une fille sauvage," &c. (I may take this opportunity of observing that in the indication of the chapters, as generally in the division of the parts of the work, a great confusion prevails in the editions. Of the four editions which I have before me, the earliest (Amsterdam, 1752, 12mo) marks this section as 'Histoire, vi.,' which is probably correct. Then there follows after chap. xv. an Appendix of seven sections, of which the first six are marked as 'Histoire i., ii.,' and so on; the seventh, containing the 'Belle Conjecture d'Arnobe,' is marked as § vii. So also in the edition of Amsterdam, 1764, 12mo. On the other hand, the editions of Berlin, 1774, 8vo, and Amsterdam, 1774, 12mo, make chap. vi. follow here, while the order of the chapters requires the number xvi.).

we must refer it to a moving principle. If, then, we find in the body a moving principle which makes the heart beat, the nerves feel, and the brain think, we will call this the soul.

So far the standpoint taken by Lamettrie seems empirical indeed, but not quite materialistic. In what follows, however, very subtly, and with constant reference to Scholastic and Cartesian principles, he gradually passes over into Materialism. Lamettrie explains the nature of matter, its relation to form, to extension, its passive qualities, and finally its capacity for motion and for sensation, apparently in agreement with the most generally accepted notions of the schools, which he very vaguely attributes to the philosophers of antiquity, as though these had been in the main agreed. He calls attention to the strict distinction made by the ancients between substance and matter, in order the more surely to sweep this distinction away. He talks of the forms through which the otherwise passive matter first receives its determination and its motion, in order indirectly to make these forms mere qualities of matter, which are inalienably attached to matter, and are inseparable from its existence.

The main object in all this, as it had already been in Stratonism, is the setting aside of the 'Primum Movens Immobile,' the Aristotelian extramundane, world-moving God. Matter only becomes a definite substance through form, but whence does it receive the form? From another substance, which is also material in its nature. This again from another, and so on to infinity, that is, we know the form only in its combination with matter. In this indissoluble union of form and matter things react and form each other, and so is it also with motion. Only the abstract, separately conceived matter is that passive thing: the concrete, actual matter is never without motion, as it is never without form; it is, then, in truth identical with substance. Where we do not perceive motion it is yet potentially present, just as matter also potentially ("*en puissance*") contains all forms in itself. There is not the

slightest reason for assuming that there is an agent outside the material world. Such a being would not even be an 'ens rationis' (*être de raison*). Descartes' assumption that God is the only cause of motion has, in philosophy, which requires evidence, absolutely no meaning: it is only a hypothesis which he has formed after the light of faith. Immediately after this comes the proof that matter possesses also the capacity of *sensation*. The method here adopted is, that this view is shown to be the original and natural one, and thus all that is needed is to demonstrate the errors of the moderns, especially of Descartes, who had controverted it. The relation of man to the brute, the weakest point of the Cartesian philosophy, naturally comes to the front. Very ingeniously Lamettrie observes that at bottom I am immediately certain only of my own feeling. That other men also feel, I conclude with very much stronger conviction from the expression of their feelings in gestures and cries than from their articulate speech. That energetic language of the emotions is, however, the same in the animals as in men, and it carries with it much stronger proof than all the sophisms of Descartes. If an argument is sought in the difference of external conformation, on the other hand comparative anatomy shows us that the internal organisation of man and of the animals offers a perfect analogy. If it remains for the present incomprehensible how the capability of feeling can be an attribute of matter, it is with this, as with a thousand other puzzles, in which, according to an idea of Leibniz, instead of the thing itself we see only the veil that hides it. It is uncertain whether matter *in itself* has the capability of feeling, or whether it attains this only in the form of organisms; but even in this case sensation, like motion, must at all events *potentially* belong to all matter. So thought the ancients, whose philosophy is preferred byall capable minds to the inadequate attempts of the moderns.

After this Lamettrie passes to the doctrine of substantial forms, and here again he still moves in the sphere of

traditional notions. He examines the view that in reality it is the forms that actualise things, because these things without form, that is, without qualitative determination, are not what they are. By substantial forms were understood those forms that determine the essential qualities of bodies; by accidental forms those that determine accidental modifications. In living bodies the ancient philosophers distinguished several forms: the vegetative soul, the sensitive, and, in the case of man, the rational soul.[62]

All feelings come to us through the senses, and these are connected with the brain, the seat of sensation, by means of the nerves. In the nerve-tubes, then, flows a fluid, the '*esprit animal*,' life-spirit, whose existence Lamettrie regards as established by experiments. There arises, then, no sensation without a change being produced in its organ by which the animal spirits are affected, and then these conduct the sensation to the soul. The soul does not feel in the places where it supposes that it feels, but it refers its sensations, according to their nature, to some point outside itself. And yet we cannot know whether the substance of the organs does not also feel; but this can only be known to the substance itself, and not to the whole creature.[63] Whether the soul occupies only a

[62] Here follows, moreover, at the end of the seventh chapter, a passage, which very characteristically anticipates the standpoint of the 'Homme Machine,' unless, that is to say, it belongs perhaps to the later recension of the 'Hist. Nat.,' and was added therefore after the completion of the 'Homme Machine.' Lamettrie says that before he discusses the vegetative soul, he must answer an objection. He had been asked how he could maintain the absurdity of the Cartesian view that *animals* are mere *machines*, while he himself denied the existence in animals of any principle other than matter. Lamettrie answers in a word; because Descartes denies all feeling to his machines. The application to man is obvious. Lamettrie does not reject the notion of the *mechanical* nature of the machine, but that of its *incapability of sensation*. We see here again clearly enough in how close relation Descartes stands to Materialism.

[63] Observe the cautiousness and acuteness with which the "ignorant and superficial" Lamettrie here goes to work. He would certainly never have made the mistake of Moleschott mentioned in the first edition, S. 440, in dealing with the case of Jobert de Lamballes. If head and spinal cord are separated, we must, according to Lamettrie, ask the spinal end whether it has any feeling, and not the head. We may here point out also that Lamettrie anticipates the standpoint of Robinet as at least conceivable.

particular point or a circuit we do not know, but as all nerves do not meet in one point in the brain, the former supposition is improbable. All knowledge is in the soul only at the moment in which it is affected by it; all preservation of it is to be resolved into organic conditions.

Thus the 'Natural History of the Soul,' starting from ordinary notions, gradually leads us on into Materialism, and at length, after a series of chapters, it is concluded *that that, then, which feels must also be material.* How this comes about Lamettrie too does not know; but why should we (according to Locke) limit the omnipotence of the Creator because of our ignorance? Memory, imagination, passions, and so on, are then explained in a thoroughly materialistic way.

The very much shorter section on the rational soul discusses freedom, reflection, judgment, and so on, with the same strong leaning to Materialism and the same reticence of results, until at length there follows a chapter over which is written, "That religious faith alone can confirm our belief as to the existence of a rational soul." But the object of this very chapter is to show how metaphysics and religion came to adopt the notion of a soul, and it concludes by saying that true philosophy freely confesses that the incomparable being which is dignified with the beautiful name of the soul is unknown to her. And mention is also made of Voltaire's phrase, 'I am body, and I think;' and Lamettrie refers with pleasure to the way in which Voltaire scoffs at the Scholastic proof for the proposition that no matter can think.

Not without interest is the last chapter,[64] which bears the title, "Narratives which prove that all Ideas are derived from the Senses." The deaf mute of Chartres, who suddenly recovered his hearing and learned to talk, and who was then found to have no religious idea of any kind, although from his youth upward he had been trained to all kinds of religious ceremonies and gestures; the blind man

[64] Chap. xv. inclusive of the Appendix; comp. Note 62.

of Cheselden, who, after the operation of couching, at first saw only a coloured light, without being able to distinguish a sphere from a cube; Amman's method of teaching the deaf and dumb, are all adduced and discussed, not without care and circumspection. Without any attempt at criticism, as was then the custom, he introduces again a series of stories of men who had become wild, and describes the orang-outang, according to very much exaggerated accounts, as of almost human conformation. Everywhere the consequence is drawn that only the education he receives through the senses makes man man, and gives him what we call the soul, while no development of the mind from within outwards ever takes place.

As the author of the Correspondence on the Nature of the Soul cannot help dragging Melanchthon into his system, so Lamettrie goes back to the father of the Church, Arnobius, from whose book, 'Adversus Gentes,' he borrows a hypothesis, which possibly became the original of the statue-man which plays its part in Diderot, Buffon, and particularly in Condillac.

Let us suppose that in a feebly illuminated subterranean chamber, from which all sounds and sense-impressions are far removed, a new-born child is scantily nourished by a naked and ever-silent nurse, and so is reared up without any knowledge at all of the world or of human life until the age of twenty, thirty, or even forty years. Then let this being leave his solitude. And now let him be asked what thoughts he has had in his solitude, and how he has been nourished and brought up. He will make no answer; he will not even know that the sound addressed to him has any meaning. Where now is that immortal particle of deity? Where is the soul that enters the body so well taught and enlightened?[65]

[65] Comp. the very interesting passage in Arnobius, Adversus Nationes, I. c. 20 ff. (p. 150 ff. ed. Hildebrand, Halis Sax., 1844), where in fact, with the view of controverting the Platonic doctrine of the soul, this hypothesis is carried out and discussed in great detail. Lamettrie's account of the passage in Arnobius is considerably abbreviated, and in the text only the main ideas are briefly stated.

Like Condillac's statue, then, this creature, which has only the shape and the physical organisation of a man, must be supposed to have received feelings through the use of the senses that gradually arrange themselves, and education must do what else is necessary to give him the soul, the capacity for which is only dormant in his physical organisation. Although Cabanis, as pupil of Condillac, rightly rejected this unnatural hypothesis, we must nevertheless concede to it a certain justification as compared with the extremely weak foundation of the Cartesian doctrine of innate ideas.

In conclusion, Lamettrie lays down the principles, "No senses, no ideas." "The fewer senses, the fewer ideas." "Little education, few ideas." "No sense-impressions, no ideas." So he very gradually attains his aim, and finally concludes: "The soul, then, depends essentially upon the organs of the body, with which it is formed, grows, decreases: 'Ergo participem leti quoque convenit esse.'"

In very different fashion does the book set to work that already in its very title declares that *man is a machine.* While the 'Natural History of the Soul' was cautious, cunningly arranged, and only gradually surprising us with its results, here, on the contrary, the final conclusion is expressed at the outset of the work. While the 'Natural History of the Soul' allied itself with the whole Aristotelian metaphysics only in order to prove by degrees that the soul is but an empty form, into which we may pour a materialistic content, here we no longer deal in all those fine distinctions. On the question of substantial forms Lamettrie controverts himself; scarcely because he had essentially changed his opinion, but because by this means he hoped to protect his name, which he tried to hide as much as possible, the more effectually from his persecutors. In the form also of the two works there is an essential difference. While the 'Natural History of the Soul' follows a regular division into chapters and sections, the 'Man as Machine' runs on in unbroken flow of speech.

Equipped in all the adornments of rhetorical prose, this work seeks to persuade as much as to prove: it is written with a conscious intention that it may find an easy reception and rapid circulation among the educated classes; a polemical treatise intended to prepare the way for a theory, not to establish a discovery. For all this, Lamettrie did not omit to support himself on a broad scientific basis. Facts and hypotheses, arguments and declamations, all are assembled in order to serve this same object.

Whether it was with the view of gaining more acceptance for his work, or the better to conceal himself, Lamettrie added to it a Dedication to Albrecht von Haller. This dedication, which Haller disavowed, led to the mixing up with the scientific question of a personal difference between these men. Nevertheless Lamettrie had this dedication, which he regarded as a masterpiece of his prose, printed still in the later editions of the book. The dedication consists of an impassioned eulogy of the delights of the Arts and Sciences.

The work itself begins with the statement that it must not suffice for a wise man to *study* nature and truth: he must dare, for the good of the few who can and will think, to *spread* them; the great mass of people is incapable of rising to the truth. All the systems of philosophers reduce themselves, with reference to the human soul, to two; the older system is Materialism, the second is Spiritualism. When we ask, with Locke, whether matter can think, that is just as if we were to ask whether matter can show the time. It will depend upon whether it can of its own nature.[66]

[66] The very acute remark of Lamettrie against Locke (indirectly also against Voltaire) runs thus: "Les métaphysiciens qui ont insinué que la matière pourroit bien avoir la faculté de penser, n'ont pas déshonoré leur raison. Pourquoi? c'est qu'ils ont un avantage (car ici c'est un) de s'être mal exprimés. En effet, demander si la matière peut penser, sans la considérer autrement qu'en elle même, c'est demander, si la matière peut marquer les heures. On voit d'avance, que nous éviterons cet écueil, où M. Locke a eu le malheur d'échouer" (Homme Machine,

Leibniz has in his 'Monads' set up an unintelligible hypothesis. "He has spiritualised matter, instead of materialising the soul."

Descartes has made the same mistake, and set up two substances, as though he had seen and counted them.

The most cautious have said that the soul can only discover itself through the light of faith. But if they reserve to themselves, as rational beings, the right to inquire what the Scriptures mean by the word 'spirit,' by which they designate the human soul, they become inconsistent with the theologians, as the theologians do amongst themselves. For if there is a God, he is just as much the author of nature as of revelation; he has given us the one in order to explain the other, and reason in order to bring them into harmony. The two cannot contradict each other, unless God is to be a deceiver. If, then, there is a revelation, it must not contradict nature. As an example of a frivolous objection against this line of thought, Lamettrie quotes the words of the Abbé Pluche,[67] who in his 'Spectacle de la Nature' had observed, with reference to Locke: "It is astonishing that a man who degrades our soul so far that he considers it a *soul of dirt*, ventures to make Reason the supreme judge in the mysteries of the faith; for what singular idea of Christianity should we have if we were to follow his Reason?" Against this childish

pp. 1, 2, ed. Amsterd. 1744). Lamettrie no doubt means to say that if we consider matter only in itself, without regarding also the relation of force and matter [the German *Materie* includes both Force and Matter, that is, *Kraft* and *Stoff*—TR.], we may just as well answer the famous question of Locke with a Yes as with a No, and in neither case with any decisive result. The matter of the clock can show the hour or not, according as we speak of an active or a passive capacity. So too the material brain could in a certain sense think, in so far as it is actuated by the soul as an instrument for the expression of thoughts. The real question is this, whether the power of thinking, which we may at all events *in thought* separate from matter, is in truth a necessary outcome of it or not. This question Locke has evaded.

[67] 'Le Spectacle de la Nature, ou Entretiens sur l'Histoire Naturelle et les Sciences,' Paris, 1732 ff., 9 vols., second edition, La Haye, 1743, 8 vols., appeared anonymously; the author is, according to Quérard (agreeing with Lamettrie, who mentions him by name), the Abbé Pluche.

kind of controversy, which even in our own day is unfortunately often directed against Materialism, Lamettrie wages quite justifiable warfare. The merit of Reason does not depend upon the word 'immateriality,' but upon her achievements. If a "soul of dirt" were to discover in a moment the relations and the due succession of an immeasurable number of ideas, then it would obviously be preferable to a dull, simple soul, though it were made of the most precious materials. It is unphilosophical to blush with Pliny over the pitiableness of our origin. For what here appears so vulgar is just the most precious thing, upon which nature has bestowed the greatest art. Even though man sprang from a much lower source, he would none the less be the noblest of beings. If the soul is pure, noble, and elevated, then it is a beautiful soul, and it honours him who is endowed with it. And as to the second remark of M. Pluche, we might just as well say, "We must not believe in Torricelli's experiment, for if we were to banish the 'horror vacui,' what a singular kind of philosophy should we have." (This illustration would be better stated thus: We must never judge of nature by experiments, for if we were to follow Torricelli's experiment, what a singular idea we should obtain of the 'horror vacui.')

Experiment and *observation*, says Lamettrie, must be our only guides: we find them in medical men who have been philosophers, and not in philosophers who have been no medical men. Doctors alone, who calmly observe the soul in its greatness as in its misery, are here entitled to speak. What can the others have to say, and especially the theologians? Is it not ridiculous to hear how they decide without shame on a question which they were never in a position to understand, from which they have, on the contrary, been constantly diverted by obscure studies, which have led them to a thousand prejudices—in a word, to fanaticism, which then still further contributes to their ignorance of the mechanism of the body?

Here, however, Lamettrie himself is already guilty of a *petitio principii*, such as he has just rightly reproached his opponents with. Even the theologians have occasion to acquire a practical experience of the human soul, and the difference therefore in the value of this experience can only be a difference of the method and of the categories under which the experience is brought.

Man is, as Lamettrie goes on to explain, a machine so constructed that it is impossible to form *a priori* a correct idea of it. We must admire the great minds that have vainly attempted this, a Descartes, Malebranche, Leibniz, and Wolff, even in their unavailing efforts, but must pursue an entirely different path from theirs; only *a posteriori*, starting from experience and from the study of the bodily organs, can we attain, if not to certainty, at least to the highest degree of probability. The various temperaments, resting upon physical causes, determine the character of the man. In diseases, the soul is at one time obscured; in another, we might say that it doubled itself; and again, it is distracted into imbecility. The convalescence of a fool makes a man of sense. The greatest genius often becomes a fool, and away goes all the admirable learning that has been acquired by so much labour. One patient asks if his leg is in his bed, another thinks that he still has the arm that has been amputated. The one cries like a child at the approach of death, the other jests at it. What would have sufficed in the case of Julius Cæsar, of Seneca, of Petronius, to turn their fearlessness into timidity or into braggartry? An obstruction in the spleen, the liver, or the vena portæ. For the imagination is intimately connected with these viscera, and from them arise all the curious phenomena of hypochondria and hysteria. What are we to say of those who believe themselves transformed into were-wolves and vampires, or who think that their noses or other limbs are of glass? Lamettrie then passes on to the effects of sleep; opium, wine, and coffee are described in their effects upon the soul. An army to which strong

drinks are given charges boldly upon the enemy, from which it would have fled after drinking water; a good meal exercises an enlivening influence.

The English nation, which eats half-raw and bloody meat, appears to derive its fierceness from such nourishment, which can be counteracted by education only. This begets in the soul pride, hatred, contempt of other nations, unlearnedness, and other defects of character, just as a coarse diet renders the mind heavy and sluggish. Hunger and continence, climate, and so on, are all traced in their influences. Physiognomy and comparative anatomy contribute their aid. If we do not find degeneration of the brain in all diseases of the mind, there are conditions of congestion or other changes in the smallest parts which occasion the disturbance.[68] "A mere nothing, a little fibre, some trifling thing that the most subtle anatomy cannot discover, would have made two idiots out of Erasmus and Fontenelle."

It is a curious idea of Lamettrie's, again, that the experiment might perhaps be successfully made of getting an ape to speak, and in this way of bringing a portion of the animal world into the sphere of human education. He compares the ape with a deaf mute; and as he is particularly enthusiastic for the recently invented method of Ammann for the education of the deaf and dumb, he is anxious to have a large and particularly clever ape in order to make experiments upon it.[69]

[68] In the whole treatment of the relation between the brain and the intellectual functions there is a striking similarity between Lamettrie and modern Materialism. He treats the matter with some fulness, while in the text only the chief points are briefly noticed. In particular, Lamettrie (the "ignorant") studied industriously Willis's epoch-making book on the Anatomy of the Brain, and took from it all that could serve his purpose. And accordingly he recognises the importance of the cerebral convolutions, the difference in the relative development of the various parts of the brain in the higher and lower animals, and so on.

[69] The detailed discussion of this problem is at pp. 22 ff. of the edition of Amsterdam, 1774. Of Ammann's method Lamettrie gives a most minute account in the 'Histoire Natur. de l'Ame'—a proof of his serious treatment of this subject.

What was man, asks Lamettrie, before the invention of words and the knowledge of language? An animal after his kind, with much less instinct than the others, and distinguished from them by nothing but his physiognomy and Leibniz's intuitive knowledge. The most excellent and better-organised specimens invented signs and taught the others, exactly as when we break in animals.

As in a violin-string the striking of a piano produces a vibration and a sound, just so the strings of man's brain, when struck by sensations of sound, produced words. But as soon as the signs of various things are given, the brain by a similar necessity begins to compare them and to note their relations, just as the properly organised eye must see. The similarity of various objects leads to their being classed together, and hence arises counting. All our ideas are closely connected with the representation of the corresponding words or signs. Everything that passes in the soul may be referred to activity of the imagination.

Whoever, then, has the most imagination must be considered the greatest mind. Whether nature took more pains to form a Newton or a Corneille, an Aristotle or a Sophokles, cannot be determined, but we may certainly say that both kinds of talent indicate merely different directions in the use of the imagination. If it is said, then, that any one has much imagination but little judgment, we only mean by this that his imagination has been too exclusively directed to the reproduction of sensations instead of to their comparison.

The chief excellence of man is his organisation. It is accordingly unnatural to suppress a moderate pride in real excellences, and all excellences, wherever they may come from, deserve to be esteemed; we must only know how to value them properly. Genius, beauty, wealth, nobility, although children of chance, have their value just as much as skill, knowledge, and virtue.

When it is said that man is distinguished from the animals by a natural law which teaches him to distinguish

good and evil, this also is a delusion. The same law is found among the animals. We know, for example, that we feel remorse after bad conduct: that other men feel the same, we must take their word for, or we must infer it from certain signs which we find in like cases in ourselves; but these very signs we see also in the animals. If a dog has bitten his master, who was teasing him, we see him immediately sad, downcast, and ashamed; by a crestfallen and crouching mien he confesses his guilt. History affords us the famous instance of that lion who would not tear his benefactor, and who displayed his gratitude amidst bloodthirsty men. From all this it is concluded that men are made of the same materials as the animals.

The moral law is, in fact, still present even in those persons who, from a morbid impulse, steal, murder, or in fierce hunger devour their dearest relatives. These unhappy creatures, who are sufficiently punished by their remorse, should be handed over to the doctors, instead of being burned or buried alive, as has been the practice. To do good involves such pleasure, that to be wicked is in itself a sufficient punishment. At this point of the argument an idea is introduced, which strictly perhaps does not belong here, but which belongs as essentially to Lamettrie's whole mode of thought as it on the other hand strikingly reminds us of Rousseau. We are all created to be *happy*, but it does not lie in our original destiny to be *learned;* perhaps we have become so only through a kind of *misuse of our talents.* Here, again, let us not forget to bestow a glance upon the chronology! The 'Homme Machine' was written in 1747, and published at the beginning of 1748. The Academy of Dijon announced in 1749 the famous thesis for the solution of which Rousseau received their prize in 1750. This small circumstance will, however, after previous experiences, scarcely prevent Lamettrie from being reproached with having decked himself in Rousseau's plumes!

The essence of the natural moral law—he then goes on—lies in the doctrine, Not to do to others what we would not that they should do to us. Perhaps, however, there lies at the bottom of this law merely a wholesome fear, and we respect the purse and the life of our fellow-man only that we may keep our own possessions safely; just as the 'Ixions of Christianity' love God and embrace so many a chimerical virtue merely because they are in fear of hell. The weapons of fanaticism can destroy those who teach these truths, but will never destroy the truths themselves.

The existence of a Supreme Being Lamettrie will not doubt; all probability speaks for it; but this Existence no more proves the necessity of worship than any other existence: it is a theoretical truth without any use in practice; and as it has been shown by innumerable examples that religion does not bring morality with it, so we may conclude that even Atheism does not exclude it.

For our peace of mind it is indifferent to know whether there is a God or not, whether he created matter, or whether it is eternal. What folly to trouble ourselves about things the knowledge of which is impossible, and which, even if we knew them, would not make us a bit happier!

People refer me to the writings of famous apologists; but what do they contain except tedious repetitions, which serve rather to confirm Atheism than to undermine it. The greatest weight is laid by the opponents of Atheism on the design in the world. Here Lamettrie refers to Diderot, who, in his 'Pensées Philosophiques,'[70] then not

[70] In the first edition it was here wrongly supposed that Lamettrie agreed with Diderot, whereas he attacks him as a Deist and Teleologist, and laughs at his 'Universum,' with the weight of which he proposes to "crush" the Atheist. On the other hand, I may point out that Diderot follows up this passage, which Rosenkranz too (i. 40) adduces to prove Diderot's Deism, with a chapter (xxi.) of quite opposite tendency. Diderot here combats the argument for Teleology (recently reproduced by Von Hartmann) from the mathematical improbability of adaptations as a mere special case of purposeless combinations of causes. Diderot's criticism

long published, had maintained that one could slay the Atheist with a butterfly's wing or with the eye of a gnat, while one had the weight of the universe with which to crush him. Lamettrie observes, on the other hand, that we are not sufficiently acquainted with the causes which operate in nature to be able to deny that she produces everything out of herself. The polyp cut up by Trembley [71] had in itself the causes of its reproduction. Only ignorance of natural forces has made us take refuge in a God, who, according to certain people (he means himself in the 'Natural History of the Soul'), is not even an 'ens rationis.' To destroy chance is no proof of the existence of God, because there may very well be something which is neither chance nor God, and which brings forth things as they are—namely, Nature. The 'weight of the universe' will therefore frighten no true Atheist, to say nothing of 'crushing' him; and all these thousand-times repeated proofs for a Creator are sufficient only for people of

fundamentally upsets this specious argument, if not with the completeness and clearness exhibited by the principles of Laplace. It is an interesting question whether Diderot in this chapter did not intend to destroy, in the case of those who *understood*, the whole effect of the previous one, while to the mass of readers he appeared to pose in an attitude of devout Deism. But we may also suppose—and this seems to be the right view—that premises naturally leading to entirely opposite conclusions lay as clearly side by side in Diderot's mind as they have found expression in the successive chapters of his work. But any one who wishes to show that Diderot was even then inclined to Atheism must rest chiefly upon this chapter. Lamettrie, indeed, who cared little for mathematics, seems not to have observed the importance of this chapter, which Rosenkranz also has overlooked. He calls the 'Pensées Philosophiques' a "sublime ouvrage, qui ne convaincra pas un athée," but he nowhere regards Diderot's refutation of Atheism as a furtive recommendation of it. And thus we must reduce to a minimum Diderot's influence upon Lamettrie. We have shown that 'L'Homme Machine' was already in principle contained in the 'Histoire Naturelle' (1745). Comp. Œuvres de Diderot, i. 110 ff., Par. 1818, Pensées Phil., cc. xx., xxi.; Rosenkranz, Diderot, i. 40 ff.; Œuvres Phil. de. M. de la Mettrie, Amsterd. 1747, iii. 54, Berlin, 1747, i. 327.

[71] Here, again, we find how Lamettrie eagerly followed the newest inquiries in the sphere of the natural sciences, and brought them into connection with his speculations. Trembley's most important publications upon Polyps fall in the years 1744-47.

hasty judgment,—proofs to which the students of nature can oppose an equal weight of contrary arguments.

"Thus is it with the arguments for and against," concludes Lamettrie; "I embrace neither side." We see, however, clearly enough which side he embraces. For he goes on to say, further, that he had communicated all this to a friend, a 'sceptic (pyrrhonien),' as he was; a man of great merit, and worthy of a better lot. His friend had said that it was certainly very unphilosophical to trouble one's self about things which we can nevertheless not make out; *the world, however, would never be happy unless it was atheistic.* And these were the 'abominable' man's reasons: "If Atheism were universally disseminated, all the branches of religion would be torn up by the roots. Then there would be no more theological wars: there would no longer be soldiers of religion, that terrible kind of soldier. Nature, which had been infected by the consecrated poison, would win back her rights and her purity. Deaf to all other voices, men would follow their own individual impulses, and these impulses alone can lead them to happiness along the pleasant path of virtue."

Lamettrie's friend has only forgotten that even religion itself, quite apart from any revelation, must be reckoned among the natural impulses of man, and if this impulse leads to all unhappiness, it is not easy to see how all the other impulses, since they have the same natural origin, are to lead to happiness. Here, again, it is not a consistent, but an inconsistent, carrying out of the system that leads to the destructive consequences. Immortality, again, is treated by Lamettrie in a similar way to the idea of God, yet he is obviously glad to maintain it to be possible. Even the insect caterpillar, he supposes, has probably never really known it was to develop again into a butterfly; we know only a small part of nature, and as the matter of which we are made is eternal, we do not know what may yet come of it. Our happiness here depends upon our ignorance. He who thus thinks will

be wise and just, tranquil as to his lot, and consequently happy. He will await death without fearing it, and also without demanding it.

Here it cannot be doubted that it is this negative side of the conclusion for which Lamettrie cares, and to which he inclines in his indirect way. He declares the idea of an immortal machine to involve no contradiction whatever; but this is not to gain immortality, but to establish in every way the machine hypothesis. In what way Lamettrie can have possibly conceived that his machine could be immortal, we indeed cannot discover: except the comparison with the caterpillar, there is no suggestion whatever made, and there was probably none intended to be made.

The life principle Lamettrie not only does not find in the soul (which is with him only the material consciousness); he does not find it in the whole, but in the separate parts. Each tiny fibre of the organised body is stirred by a principle inhabiting it. For this he adduces the following grounds:

1. The flesh of animals continues to palpitate after death, and the longer in proportion to the coldness of the animal's nature (tortoises, lizards, snakes).

2. Muscles separated from the body contract when they are excited.

3. The intestines retain for a long period their peristaltic action.

4. The injection of warm water reanimates the heart and the muscles (according to Cowper).

5. The heart of the frog moves for more than an hour after its separation from the body.

6. Similar observations have been made, according to Bacon, in the case of a man.

7. Experiments upon the hearts of fowls, pigeons, dogs, rabbits. The amputated paws of the mole still move.

8. Caterpillars, worms, spiders, flies, snakes exhibit the same phenomenon. In warm water the movement of the separated parts is increased ("à cause du feu qu'elle contient").

9. An intoxicated soldier beheaded a turkey-cock with his sabre. The creature halted, moved on, and finally ran. When it ran up against a wall, it turned round, beat its wings as it continued to run, and finally fell down (own observation).

10. Dissected polyps reproduce themselves in eight days into as many animals as there were portions made.

Man stands in the same relation to the animals as one of Huyghens' astronomical clocks to a common timepiece. As Vaucanson used more wheels for his flute-player than for his duck, so the driving-works of a man are more complicated than those of the animals. For a speaker Vaucanson would require still more wheels, and even such a machine can no longer be considered an impossibility.

It certainly must not be supposed that by a speaker Lamettrie had meant here a rational man; yet we see how delighted he is to compare the masterpieces of Vaucanson, which are so characteristic of their age, with his human machine.[72]

Lamettrie, moreover, in thus carrying out to extremities the principle of mechanism in human nature, is controverting himself, since he makes it matter of reproach to the author of the 'Natural History of the Soul' that he had retained the unintelligible doctrine of 'substantial forms.' But from what has been already said, it will be

[72] As to the mechanical automata of Vaucanson, and the still more ingenious ones of the two Drozs, father and son, comp. Helmholtz, 'Ueber die Wechselwirkung der Naturkräfte, Vortrag vom 7 Febr. 1854,' where the connection of these attempts, which to us seem mere child's play, with the progress of mechanics and with the expectations of what was to be achieved by them, is very justly demonstrated. Vaucanson may in a certain sense be called a forerunner of Lamettrie in the idea of the 'Homme Machine.' The two Drozs, with their still greater achievements (the Writing Boy and the Piano-playing Girl), were as yet unknown to Lamettrie. Vaucanson's Flute-player was first exhibited at Paris in 1738.

[73] The first edition of the 'Natural History of the Soul' professed to be a translation from the English of Mr. Sharp (thus given in Quérard, 'France Littéraire') or Charp (so written in the 'Homme Machine,' where "le prétendu M. Charp" is attacked, in the editions of the Œuvres Philosophiques of 1764 Amsterdam, 1774 Amsterdam, and 1774 Berlin).

evident that there is here no change of opinion, but merely an artifice adopted partly to help his anonymity, but partly also that he may, while starting from two opposite sides, yet work up to the same point. To make it more than clear, however, we will point out yet another passage from the fifth chapter of the 'Natural History of the Soul,' in which it is expressly said that the forms arise out of the pressure of the particles of one body upon the particles of another, which means simply this, that it is the forms of Atomism which are here concealed beneath the mask of the 'substantial forms' of the Scholastics.

Upon this same occasion, also, the tables are suddenly turned with regard to Descartes. However wrong he may have been in other respects, it is here said, this single fact would still make him a great philosopher, that he had declared the animals to be machines. The application of this to man is so obvious, the analogy is so striking and overwhelming, that every one must see it, and the theologians were the only people who did not detect the poison lurking in the bait which Descartes induced them to swallow.

Lamettrie concludes his work with some considerations on the conclusiveness and certainty of the conclusions he had built up on the foundation of experience, as compared with the childish exertions of the theologians and metaphysicians.

"This is my system; nay, if I am not mistaken, this is the truth. It is short and simple; let him who can refute it do so!"

The scandal which this work produced was great, but not unintelligible; and just as rapid was its diffusion. In Germany, where every educated person was acquainted with French, there appeared no translation, but the original was read the more eagerly, and in the course of the next few years it was reviewed in all the more important periodicals, and immediately called forth a torrent of refutations. No one declared himself freely and openly in

favour of Lamettrie; but the moderate tone, as compared with our contemporary controversy, and the calm and thorough criticism of many of these replies, show the more plainly that the general feeling did not regard this Materialism as being so absolutely monstrous as it is in our own day declared to be. In England there appeared soon after the publication of the original a translation, which attributed the book to the Marquis d'Argens, an amiable freethinker, also one of the intimates of Frederick the Great; but the real author could not long remain concealed.[74]

It made Lamettrie's case decidedly worse that he had already published a professedly philosophical work on 'Volupté,' a production followed later by others of the same kind. In the 'L'Homme Machine' also, sexual matters, even where they have no strict relevancy to the argument, are here and there discussed with a certain deliberate license. We have no wish either to overlook here the influence of his age and nationality, or even to deny a certain lamentable personal weakness, but we must insist upon this, that Lamettrie believed that his system required him to justify sensual pleasure, and that because he had conceived these ideas, so therefore he expressed them. In the preface to the collective edition of his philo-

[74] In the review of the 'L'Homme Machine' in Windheim's Götting. Phil. Bibliothek, i. Bd., Hannover, 1849, S. 197 ff., it is said: "We will only add further, that this work has already been published in London by Owen, under the following title: 'Man a Machine; translated of the French of the Marquis d'Argens,' and that the author has very much copied the 'Histoire de l'Ame,' which was published in the year 1745, and which also defends Materialism." Lamettrie's plagiarisms from himself may therefore, as we can see from this instance, have very probably contributed to gain him the reputation of decking himself with other people's plumes. The French original contained an advertisement of the publisher, Elie Luzak (reprinted in the edition of Berlin, 1774, written, we may conjecture, by Lamettrie, who published later the reply, 'L'Homme plus que Machine,' under the same name), in which it is stated that the manuscript had been sent to him from Berlin by an unknown hand, with the request that six copies of the work might be sent to the Marquis d'Argens, but that he was convinced that this address was a mere mystification.

sophical writings he confesses this principle: "So write as if thou wert alone in the universe, and hadst nothing to fear from the jealousy and prejudices of men, or—thou wilt fail of thy end."

Perhaps Lamettrie has tried to wash himself too white when in this defence, written with all the powers of his rhetoric, he distinguishes between his life and his writings; but at all events, we know of nothing to justify the tradition that he was a "licentious profligate, who sees in Materialism only the justification of his own debauchery." The question we have to consider is not whether Lamettrie, like so many authors of his own times, led a profligate and frivolous life—although even for this there are scarcely satisfactory proofs—but rather whether his literary activity had its foundation in personal depravity, or whether he was possessed by an idea of real importance and value as a transitional stage, and devoted his life to its exposition. We understand the resentment of his contemporaries, but we are nevertheless convinced that posterity must pass a much more favourable judgment upon this man, unless he alone is to be denied the justice otherwise generally accorded.

A young man who, after passing brilliantly through his course of study, has already acquired a successful practice, does not give this up in order to carry his studies deeper in a special home of science, unless there is in him a living ardour in the pursuit of truth. The satirist of medicine knew only too well that charlatanism in medicine was better paid than rational treatment. He knew that it would cost a struggle to secure the entrance into France of the principles of a Boerhaave and a Sydenham. Why did he undertake this struggle, instead of insinuating himself into the confidence of the ruling authorities? Was it only his natural love of gain that impelled him to this? Why then, in addition to satire, the toilsome and time-engrossing labour of translations and excerpts? Money to so clever and skilful a man could undoubtedly come

better and more easily by medical practice. Or was it perhaps that Lamettrie by his medical writings tried to drown the voice of his conscience? The whole idea of a personal justification is as alien as possible to his nature. Before whom was he to justify himself? Before the people—that he, in common with most of these French philosophers, regarded as an indifferent rabble, who are not yet ripe for free thought? Before his own circle, in which, with rare exceptions, he found only people who loved the debaucheries of sensuality as much as he did, and who only took care not to write books about it? Or, finally, to himself? In the whole range of his writings we find only cheerful contentment and self-sufficiency, without any trace of that dialectic of the passions which is developed in a lacerated spirit. Lamettrie may be called shameless and frivolous, and these are serious charges, but they are not in the least decisive of the whole significance of a character. We are not aware of any special enormities of his. He neither sent his children to the Foundling, like Rousseau, nor betrayed two girls, like Swift; he was not convicted of corruption, like Bacon, nor does the suspicion of forgery rest upon his name, as upon Voltaire's. In his writings, indeed, crime is excused as a disease, but nowhere is it, as in Mandeville's notorious 'Fable of the Bees,' recommended.[75] Lamettrie was fully

[75] It is only when we regard particular passages in Lamettrie, apart from their context, that he seems to recommend vice; while in Mandeville vice is justified by the chain of his ideas, by the fundamental idea of a philosophy expressed in few lines, but very definite, and in our own days very widely spread, though without any ostentation. The strongest thing that Lamettrie has said in this direction is no doubt the passage in the 'Discours sur le Bonheur,' p. 176 ff., which may be thus summarised: 'If nature has made you a hog, go wallow in the mire like the swine; for you are capable of no higher happiness, and your remorse would only poison the only happiness of which you are capable, without benefiting anybody.' But the very condition is that one shall be a hog in human form—not a very inviting supposition. With this compare the following passage taken by Hettner (Literaturg., i. 20) from the Moral of the 'Fable of the Bees:' "Then leave Complaints: Fools only strive To make a Great, an Honest Hive. T'enjoy the World's Conveniences, Be fam'd in War, yet live in Ease Without great Vices, is a vain Eutopia seated in the Brain.

justified in his attack upon the unfeeling cruelty of the administration of justice, and when he proposes to substitute the physician for the clergyman and the judge, we may find in this an error, but no extenuation of crime; for nobody finds anything desirable in disease. It is, in fact, surprising, considering the intense indignation with which Lamettrie was everywhere regarded, that not one single positive accusation has been brought against his life. All the declamations over the wickedness of this man, whom we certainly do not propose to reckon amongst the most virtuous of men, are simply abstracted from his own writings, and these writings, with all their one-sided rhetoric and idle ridicule, nevertheless contain a very considerable core of sound thinking.

Lamettrie's theory of morals, as it is laid down especially in the 'Discours sur le Bonheur,' contains all the essential principles of the doctrine of self-love as a virtue, as it was later systematically developed by Holbach and Volney. The foundation consists of the subversion of absolute morality and the substitution of a relative morality, founded upon society and the state, as it is seen in Hobbes and Locke. With this Lamettrie combines his own peculiar doctrine of pleasure, which was again stripped away by his French successors, and replaced by the vaguer idea of self-love. A further element peculiar to him is the

Fraud, Luxury, and Pride must live, whilst we the Benefits receive. . . . So Vice is beneficial found, . . . As necessary to the State, As Hunger is to make 'em eat." I remember reading an attempt, in a since extinct periodical ('Internationale Revue,' Wien, Hilberg's Verlag), to defend Mandeville, with express reference to this passage of my work. The method of defence is to summarise the 'Fable of the Bees,' and to point out that there is nothing here that could excite any particular surprise nowadays. But this I have never said. On the contrary, I am of opinion that the theory of the extreme Manchester school, and the practical morality of its founders, as well as of other very respectable circles of contemporary society, are in no merely accidental agreement with Mandeville's 'Fable,' but historically and logically spring from the same source. And in so far as it is shown that Mandeville, in representing a great historical idea, is at least raised above any personal and individual complacency towards vice, I have nothing to object. All I maintain is this: Mandeville recommended vice, Lamettrie did not.

great importance which he attaches to *education* in relation to morality, and the polemic which he combines with it against *remorse.*

In view of the singular caricatures which are still constantly served up as accounts of Lamettrie's moral doctrine, we will not omit to describe very briefly the most essential features of his system.

Man's happiness rests upon the feeling of pleasure, which in its quality is in coarse and delicate, brief and lasting pleasure everywhere the same. As we are merely bodies, consequently the highest intellectual delights are also in substance bodily pleasure, although in point of value the feelings of pleasure are very different. Sensuous pleasure is intense but brief, the happiness which flows from the harmonious concord of our whole nature is calm but lasting. The same unity in variety which reigns through all nature is found also in this sphere, and every kind of pleasure and happiness must therefore in principle be regarded as equally justified, although noble and cultured natures have other joys than low and vulgar ones. This difference is secondary, and simply considered in its essence, pleasure comes not only to the ignorant man as well as to the educated, but also to the wicked no less than to the good man (compare Schiller: "Alle Guten, alle Bösen folgen ihrer Rosenspur").

Sensation is an essential, culture only an accidental, property of man; the main question therefore is, whether man can be happy under all circumstances, that is, whether his happiness is based upon sensation and not upon culture. This is proved by the vast mass of the uncultivated who feel themselves happy in their ignorance, and who even in death console themselves by chimerical expectations which are a benefit to them.

Reflection may heighten pleasure, but cannot afford it. He who is happy through it has a higher happiness, but more frequently it destroys happiness. One man feels himself happy owing to his natural disposition, another

enjoys wealth, fame, affection, and yet feels himself unhappy, because he is unquiet, impatient, jealous, and a slave of his passions. The intoxication of opium produces by physical means a happier frame of mind than any philosophical treatise. How happy a man would be who all through his life could enjoy such a frame of mind as this intoxication transiently procures him! The happiness of a dream, yes, even of a happy delusion, is therefore to be regarded as a real happiness, especially as our waking state is often not much more than a dream. Intellect, knowledge, and reason are often useless to secure happiness, sometimes even injurious. They are a superfluous adornment with which the soul can dispense, and the great mass of mankind, who actually do dispense with them, are not thereby shut out from happiness. The sensuousness of happiness is rather the great means by which nature has given to all men the same right and the same claim to contentment, and has rendered existence pleasant for them all alike.

About up to this point (about one-sixth of the whole) Hettner, judging from his report,* appears to have examined the 'Discours sur le Bonheur,' although, indeed, even here not without destroying the logical connection of the ideas. But so far we have only the groundwork of this ethical system, and it is quite worth while to see what theory of virtue is erected upon this foundation. But first another word about the foundation.

It will be seen already, from what we have said above, that Lamettrie only gives the first place to sensual pleasure because it is universal. What we understand by intellectual enjoyment is not denied in its objective nature, still less so in its value for the individual, nor in the individual ranked lower than sensual pleasure, but it is simply subsumed under the universal nature of the latter; it is treated as a special case, which in the general consideration of principles cannot have the same import-

* Literaturg. des 18ten Jahrh., ii. S. 388 ff.

ance as the universal principle itself, but the relatively higher value of which is nowhere controverted. Let us compare with this a saying of Kant's: "We may, then, as it seems to me, very well concede to Epikuros that all pleasure, if it is occasioned by notions which awake æsthetic ideas, is *animal*, that is, corporeal sensation, without thereby doing the least violence to the *intellectual* feeling of respect for moral ideas, which is not pleasure, but a self-esteem (of humanity in us) that raises us above the need of it,—aye, or even to the less noble feeling of *taste*."[76] Here we have justification and criticism together. Lamettrie's ethic is objectionable because it is a system of hedonism, not because it analyses even such enjoyments as are produced by means of ideas into sensual pleasure.

Lamettrie, next of all, explains more exactly the relation of happiness and culture, and finds that reason is not in itself hostile to happiness, but only through the prejudices that attach themselves to thought. When freed from these, and based upon experience and observation, even reason is rather a support of our happiness. It is a good guide if it will permit itself to be guided by nature. The cultivated man enjoys a higher happiness than the ignorant.[77] Here, too, we have the first reason for the importance of education. The natural organisation is indeed the first and most important source of our happiness, but education is the second, and is also of the utmost importance. It may by its advantages compensate for the defects of our organisation: its first and highest aim, however, is to tranquillise the soul by the truth. It will hardly be necessary to add that Lamettrie here, like Lucretius, has chiefly in his mind the subversion of belief in immortality. He takes especial pains to show that Seneca[78] and Descartes

[76] Kant's Kritik d. Urtheilskraft, § 54; v. S. 346, ed. Hartenstein.

[77] "Toutes choses égales, n'est-il pas vrai, que le savant avec plus de lumières, sera plus heureux que l'ignorant?" pp. 112, 113, ed. Amsterdam, 1774.

[78] The 'Discours sur le Bonheur' or 'Anti-Sénèque' served originally as introduction to a translation made by Lamettrie of Seneca's treatise 'De Vita Beata.' On the fondness of the French for Seneca, comp. Rosenkranz, Diderot, ii. S. 352 ff.

were at bottom of the same opinion. The latter especially is here again warmly eulogised; what he dared not teach, because of the theologians, who sought to corrupt him, he has at least so prepared that lesser but bolder minds after him could not but discover the consequences of themselves.

In order now from this eudæmonistic foundation to reach the notion of virtue, Lamettrie employs the state and society—in a way, however, differing essentially from Hobbes.[79] He agrees with Hobbes in holding that there is no such thing as virtue in an absolute sense, that anything can be called good or bad only relatively—in relation, in fact, to society. Instead of the absolute command by the will of 'Leviathan,' however, we have the free judgment of the individual as to the good and evil of society. The distinction between legality and morality, which in Hobbes wholly disappears, here again asserts itself; although here, too, law and virtue so far flow from the same spring that they are both in a sense political institutions. Law is there to frighten and restrain the bad; the ideas of virtue and merit are the inducements to the good to dedicate their powers to the common weal.

Here we find in the way in which Lamettrie describes the furtherance of the common weal through the sense of honour, the complete germ of the moral theory that was later so thoroughly worked out by Helvetius. The most important principle, too, upon which Materialism can depend, the principle of sympathy, is mentioned, although only incidentally. "We are enriched in a manner by the good that we do, we participate in the joy that we confer." The relation to the individual prevents Lamettrie from recognising in its full extent the general truth that he now

[79] Towards the end of the work, S. 188, ed. Amsterdam, 1774, Lamettrie asserts that he has borrowed nothing whether from Hobbes nor from Milord S—— (Shaftesbury?); he has created everything out of nature. It is clear, however, that assuming the *bona fides* of the declaration, the influence of these predecessors upon the development of his modes of thought is in no way redargued.

touches on. How incomparably purer and more beautiful is the expression of Volney later in the 'Catechism of the French Citizen.' Nature, it is there said, has organised man for society. "In giving him sensations, she so organised him that the sensations of others are mirrored in him, and awaken answering sensations of pleasure, of pain, of sympathy, that make the charm and indissoluble bond of society." Of course the 'charm' here, too, is not lacking as a bond between sympathy and that principle of self-love which the whole series of the French moralists from Lamettrie onwards consider indispensable With bold sophistry Lamettrie derives even the contempt of vanity, in which he finds the height of virtue, from vanity. Even happiness, he teaches, must come from ourselves, not from others. It is a great thing when we have at our command the hundred-voiced goddess to bid her be silent, and to be one's-self one's own glory. He who knows that he outweighs in credit all his native town loses no glory by dispensing with the approbation of his fellow-citizens, and contenting himself with his own self-approval.

The source from which the virtues are derived is, we see, not the purest; but still the virtues are there and are recognised, and we have no reason for supposing that Lamettrie was not quite serious. But how stands it with his notorious defence or even recommendation of the vices?

Lamettrie explains quite correctly from his standpoint that the whole distinction between the good and the bad consists in this, that with the former public outweigh private interests, while the contrary is the case with the latter. Both are subject to necessity. From this Lamettrie thinks it must follow that repentance is to be wholly condemned, since it only disturbs the man's peace of mind without influencing his conduct.

It is interesting to observe how here, in the worst point of his system, there has obviously crept in an inconsistency with his own principles, and that, too, the point where the charges against his personal character find most support.

Let us, in order that we may present neither too unfavourable nor too favourable a picture of him, show how it was that he came to direct this attack upon remorse. The starting-point was obviously the observation that, as a consequence of our bringing up, regret and remorse often move us in regard to things which the philosopher cannot consider blameworthy. In this we refer at first, of course, to the whole attitude of the individual with regard to religion and the Church, but also and especially to the presumably harmless sensual pleasures, particularly those of sexual love. Now in this very sphere there was lacking in the French writers of that era, with Lamettrie at the head of them, any finer sense of discrimination, because in the only society that they knew the blessings of a stricter family life, and the greater purity of manners inseparable from it, were already long lost and almost forgotten. The eccentric notion of a systematic reward of virtue and bravery by intimacy with the most beautiful women, which is recommended by Helvetius, is preluded by Lamettrie in the complaint that virtue is deprived of part of its natural reward by inexpedient and unjustifiable scruples; and the universal application of this principle rests upon his designation of remorse as the rights of an earlier moral stage, which has now, however, no longer a meaning for us.

Here, however, Lamettrie clearly forgets that he has expressly attributed to education the highest importance for the individual as well as for society, and this in two ways. Primarily education serves, as we pointed out above, the improvement of the individual's own organisation. But next Lamettrie also admits the right of society, for the sake of the common weal, to promote by education the extension of those ideas which lead the individual to serve the community, and in its service to find his happiness, even at a sacrifice to himself.

As, now, the good man is fully justified in rooting out those stings of conscience that are due to a defective education which unjustly condemns sensuous enjoyments, so

the bad man, to whom Lamettrie would always allow so much happiness as is possible for him, is invited to rid himself of any remorse whatever, because he could not act otherwise than he does, and because avenging justice will, with or without his remorse, sooner or later overtake him.

There is here obviously not only the error of the absolute division of men into 'good' and 'bad,' which overlooks the infinite varieties in the psychological combinations of good and bad motives, but, moreover, psychological causality with regard to remorse of the bad is abandoned, while it is assumed in the case of the good. If it may happen that these latter abstain from harmless enjoyments through the remains of their acquired morality, it must manifestly be possible also that the bad may abstain from bad actions through the like remains of acquired sentiments. It is evident also that the regret felt in the first case may become a restraining motive in the second case; but this Lamettrie must deny or overlook in order to reach his radical rejection of all regret.

A better result of his system is his demand that punishments shall be humane and as mild as possible. Society must for its own preservation prosecute the bad, but it must not inflict upon them greater evil than this object requires. Finally, we may observe that Lamettrie tries to give greater completeness to his system by maintaining that pleasure makes man gay, cheerful, and amiable, and is therefore in itself a real bond of society, while self-denial makes the character hard, intolerant, and unsociable.

Judge this system of morals as we like, we cannot deny that it is thought out and rich in ideas whose importance is sufficiently shown by the fact that they later appear in other thinkers in broad and systematic development, and powerfully excite the interest of their generation. How far men like Holbach, Helvetius, and Volney were conscious of drawing upon Lamettrie we cannot inquire. It is very certain that they all read him, and that they all

believed themselves far above him. And in fact, many of these ideas lie so much in the character of the time, that we may credit Lamettrie with priority, but not so certainly with originality. How much of such things circulates from mouth to mouth before any one ventures to write it down and have it printed! How much conceals itself in works of the most different kinds in some ambiguous phrase, in hypothetical shape, apparently thrown out in a jest, where we should never have thought of looking for it. Montaigne especially is for French literature an almost inexhaustible treasure of daring ideas, and Lamettrie shows by his citations that he had read him industriously. If we add to him Bayle and Voltaire, of whom the latter indeed only began to show his radical leanings after Lamettrie's appearance, we shall easily see that it would require a special study of the question to establish everywhere what is reminiscence and what is Lamettrie's own idea. So much, however, we may conscientiously assert, that scarcely a single author of this period tries less than he to deck himself with borrowed plumes. Seldom as we find *exact* citations in him, just as frequently do we find that he indicates his predecessor, at least by a word, by an allusion; perhaps concerned rather to find sharers of his views where he stands alone than conversely to exhibit himself as original where he is not so.

An author, moreover, like Lamettrie, must easily have chanced upon the most heterodox ideas, as he not merely does not shrink from heterodox ideas and expressions shocking to ordinary minds, but actually seeks for them. In this respect we cannot find a greater opposition than there is between the outspokenness of Montaigne and that of Lamettrie. Montaigne seems to us, even in his boldest ideas, almost always *naïf*, and therefore amiable. He gossips away like a man who has not the remotest intention of shocking any one, and from whom there suddenly slips an expression the force of which he seems himself not to perceive, while it startles or astonishes the reader as soon as he

realises it and dwells upon it. Lamettrie is never *naïf*. Studied seeking for effect is his worst error, but it is also the error which has most avenged itself, because it makes it so easy for his opponents to misrepresent his real idea. Even apparent contradictions in his statements may be very frequently explained (apart from the deliberate attacks upon himself to veil his personality) from the exaggerated expression of a contradiction which must not be understood as denial, but only as partial limitation.

The same character makes those productions of Lamettrie so specially repulsive in which he has attempted a sort of poetical exaltation of sexual pleasure. Schiller says as to the licenses of poetry in respect of the laws of decorum, "Only *nature* can justify them," and "Only *beautiful* nature can justify them." In both respects the mere application of this standard to Lamettrie's 'Volupté' and 'L'Art de Jouir' most conclusively condemns them as literary products. Ueberweg says with justice of these works that they attempt to justify sensual enjoyment in a manner of artificial exaggeration much more than of frivolousness. Whether a man is to be more sharply condemned who deliberately invents such things from principle than when they flow naturally from his pen, we leave undetermined.

At all events, we need not take it so ill of Frederick the Great that he showed so much interest in Lamettrie, and when he was forbidden to stay in Holland invited him to Berlin, where he became reader to the King, was admitted to the Academy, and resumed his medical practice. "The reputation of his philosophy and his misfortunes," says the King in his 'Éloge,' "were sufficient to secure M. Lamettrie an asylum in Prussia." So that he accepted the 'L'Homme Machine' and the 'Histoire Naturelle de l'Ame' as philosophy. When later he spoke disparagingly of Lamettrie's productions, he was doubtless thinking rather of the works we have just been discussing. Of his personal character the King always spoke very favourably, not only in this

official 'Éloge,' but also in private conversation. And this is the more important as Lamettrie, it is well known, took many liberties at court, and behaved with much nonchalance in the King's society.

It is chiefly by his death that Lamettrie has injured his own cause. If modern Materialism had only had such representatives as Gassendi, Hobbes, Toland, Diderot, Grimm, and Holbach, those fanatics who are so fond of basing their judgments upon passing individualities would have lost an admirable opportunity of condemning Materialism. Scarcely had Lamettrie enjoyed for a few years his new prosperity at the court of Frederick the Great, when the French ambassador Tirconnel, whom Lamettrie had recovered from a severe illness, gave a feast to celebrate his recovery, which was fatal to his imprudent doctor. It is said that to exhibit his power of gluttony, and perhaps also of his robust constitution, he devoured the whole of a pâté aux truffes, after which he became unwell immediately, and died in the ambassador's house in the delirium of a violent fever. This circumstance caused the greater sensation as just then the euthanasia of the Atheists was a much-debated question. In 1712 a French work had appeared, attributed chiefly to Deslandes, which contained a list of the distinguished men who have died with a jest upon their lips. In 1747 it had been translated into German, and was still fresh in the public recollection. In spite of its defects, it had a certain importance, through its opposition to the orthodox doctrine that recognises only a death of despair or one of reconciliation with the Church. Just as people were always discussing whether an Atheist could lead a moral life, and so (according to Bayle's hypothesis) whether a community of Atheists is possible, it was also a topic of controversy whether an Atheist can die in peace. In defiance of logic, which attaches much greater importance to a single negative instance, in the forming of a universal proposition, than to a whole series of positive instances, vulgar

prejudice in such cases regards a single case that favours its own view more than all that are against it. But Lamettrie's death in a delirious state after the devouring of a large pâté aux truffes is an object that so completely fills the fanatic's narrow horizon as to leave room for no other idea. And yet the whole sensational story as to its chief point—the real cause of death—is by no means free from doubt. Frederick the Great says in his funeral oration: "Lamettrie died in the house of Milord Tirconnel, the French plenipotentiary, whom he had restored to life. It seems that the disease, knowing with whom it had to deal, was cunning enough to attack him first by the brain, in order to destroy him the more surely. A violent fever with fierce delirium came on. The invalid was obliged to have recourse to the science of his colleagues, but he failed to find the succour that his own skill had so often afforded as well to himself as to the public." The King tells indeed a very different story in a confidential letter to his sister, the Markgräfin von Bayreuth.[81] There he mentions that Lamettrie had contracted an indigestion by devouring a pheasant pasty. But as the proximate cause of death the King seems to regard a blooding which Lamettrie prescribed for himself, in order to prove to the German physicians, with whom he was at variance on this point, the utility of bleeding in such a case.

[81] This letter, in which occurs also the unfavourable judgment of Lamettrie as an author mentioned above ("Il était gai, bon diable, bon medecin et tres mauvais auteur; mes en ne lisant pas ses livres il y avait moyen d'en être tres content"), is dated the 21st Nov. 1751; an extract is to be found in the Nouv. Bibliogr. Générale s. v. Lamettrie.

CHAPTER III.

'THE SYSTEM OF NATURE.'

If it lay within our plan to trace through all their windings the individual ramifications of materialistic thought, to test the greater or less consistency of the thinkers and writers who sometimes merely upon occasion favour Materialism, sometimes in a gradual development approach nearer and nearer to it, sometimes finally betray, only, as it were, against their will, distinctly materialistic sentiments, no epoch would offer us such plentiful material as the second half of the eighteenth century, and no land would occupy a larger space in our history than France. There is, first of all, Diderot, the man of fire and genius, who is so often called the head and leader of the Materialists, while he really not only needed a long course of development before he reached what can be properly called a materialistic standpoint, but even to the last moment remained in a state of ferment which never allowed him to perfect and elucidate his views. This noble nature, which comprised in itself all the virtues and all the faults of the Idealist, especially zeal for human welfare, self-sacrificing friendship, and unfaltering faith in the good, the beautiful, the true, and in the perfectibility of the world, was driven, as we have seen, by the tendency of the times and against his will, as it were, towards Materialism. Diderot's friend and colleague, D'Alembert, on the other hand, was already far beyond Materialism, "feeling himself tempted to believe that everything we see is but an illusion of the senses, that there is nothing without us corresponding to

what we believe we see." He might have become for France what Kant became for the world, if he could have held fast to this idea, and had raised himself but a little above the level of a sceptical fit. As it was, however, he did not even become the 'Protagoras' of his time, as Voltaire's jest would have made him. The cautious and reserved Buffon, the discreet and diplomatic Grimm, the vain and superficial Helvetius—all these men approach to Materialism without exhibiting the fixity of principle and the logical carrying out of a great idea which distinguish Lamettrie in spite of his frivolity of phrase. We ought, indeed, to mention Buffon as a zoologist, and especially deal with Cabanis, the father of the materialistic physiology, but that our plan requires us at once to take up the decisive points, and to reserve a glance at the special sciences, until we have exhibited the history of the fundamental problems. And so we are justified in lightly passing over the period between the appearance of the 'L'Homme Machine' and of the 'Système de la Nature,' rich field as it presents to the historian of literature, and coming at once to the work which has often been designated as the Code or the Bible of all Materialism.

The 'System of Nature,' with its frank, straightforward speech, its almost German march of ideas, and its doctrinaire prolixity, suddenly and clearly exhibited the result of all the brilliant ideas with which the age was then fermenting, and this result in its rigid absoluteness repelled even those who had most contributed to bring it about. Lamettrie had chiefly frightened Germany. The 'System of Nature' frightened France. If in Germany this result was aided by the frivolity which is repugnant to the German's inmost soul, in France the didactic seriousness of the book had doubtless its share in the irritation which it encountered. A great difference was made by the time of their appearance as compared with the intellectual condition of the two nations. France was approaching the Revolution, while Germany was about to enter on the classic era of

its literature and philosophy. In the 'Système de la Nature' we feel already the cutting blast of the Revolution.

It was in the year 1770 that the work appeared under the title 'Système de la Nature, ou les Lois du Monde physique et du Monde moral,' nominally in London, but really at Amsterdam. It bore the name of Mirabaud, then ten years dead, and even gave a short sketch of the life and writings of this man, who had been secretary of the French Academy. Nobody believed in his authorship, but singularly no one divined the true origin of the book, although it had proceeded from the very heart of the materialistic camp, and was, in fact, but one link in the long chain of the literary productions of an original and important personage.

Paul Heinrich Dietrich von Holbach, a rich German baron, born at Heidelsheim in the Palatinate in 1723, came to Paris early in his youth, and, like his countryman Grimm, whose intimate friend he was, became naturalised into French life. If we consider the influence exercised by these men in their circle, and compare with them the characters of the gay and brilliant society that gathered round Holbach's hospitable hearth, we easily see that we must attribute to these two Germans a decisive part in the philosophical questions that were here discussed. Quiet, inflexible, impassive, like self-absorbed helmsmen, they sit among this whirlpool of eddying talent. With the function of observers they unite, each in his own way, a far-reaching influence that is the more irresistible because it is so imperceptible. Holbach especially seemed little more than the always good-natured and generous *maître d'hotel* to the society of philosophers, whose humour and friendliness charmed everybody, whose benevolence, whose domestic and social virtues, whose modest and simple feeling in the midst of affluence, were the more admired because every kind of talent about him met with the fullest recognition, without Holbach's claiming any other

part than that of an amiable host. This very modesty it is that is the real cause why people found it so difficult to consider Holbach himself as the author of the book which had set the learned world in commotion. Even after it had long been certain that the book must have proceeded from his immediate circle, it was still attributed now to the mathematician Lagrange, who had been tutor in Holbach's family, now to Diderot, and again to a systematic collaboration of several minds. There is now, however, no room to doubt that Holbach is the real author, although particular sections were contributed to by Lagrange, the specialist, Diderot, the master of style, and Naigeon, a literary assistant of Diderot and Holbach.[82] Not only was Holbach the actual author of the whole, but his was the systematic head that controlled the work and gave it its tendency. And he did not merely bring its tendency to the work, but had at his command a rich store of scientific knowledge. He had particularly studied chemistry, and had written articles on it for the 'Encyclopédie,' and translated several chemical works from the German. "It was with his learning," writes Grimm, "as with his wealth. No one would ever have suspected it if he could have concealed it without lessening his own satisfaction, and especially that of his friends."

Holbach's other writings,[83] which are numerous, treat for the most part the same questions as the 'System of Nature,'—partly as in his 'Le Bon Sens, ou Idées Naturelles opposées aux Idées Surnaturelles,' 1772, in a popular shape, with the express object of influencing the masses. Even Holbach's political views were clearer and more definite than those of most of his French contemporaries, though he does not pronounce for any particular form of government. He does not share the vague enthusiasm for English institutions which rest upon so much that it is

[82] Comp. Hettner, ii. 364. On Naigeon, the 'Parson of Atheism,' comp. Rosenkranz, Diderot, ii. 288 ff.

[83] Comp. Rosenkranz, Diderot, ii. 78 ff.

impossible to impart. With calm and passionless force he develops the right of nations to decide for themselves, the duty of all authorities to submit to this right, and to serve the destinies of the nations, the criminality of all pretensions against the sovereignty of the people, and the nullity of all treaties, laws, and formalities that seek to maintain such criminal pretensions on the part of individuals. The right of the people to revolution in desperate circumstances is to him an axiom; and here he hit the nail upon the head.

Holbach's morality is serious and pure, though he never gets beyond the notion of happiness. It lacks the inwardness and the poetic breath that animates Epikuros's theory of the harmony of the soul, yet it makes a great effort to surmount the standpoint of the individual, and to establish virtue upon the interests of the state and of society. What we are inclined to regard as a frivolous feature in the 'System of Nature' is not so much a superficial trifling with morality—which would be real frivolity—as the complete ignoring of the moral and ideal value of traditional institutions, especially of the Church and belief in revelation. While this is, in the first place, a result of the lack of historical sense in the eighteenth century, it is doubly intelligible in a nation which, like the French in these times, possesses no genuine poetry; for from this vital source it is that everything flows that has a deep-seated principle of life and action in the nature of man, without waiting for any justification from reason. Thus it is that in Goethe's celebrated judgment on the 'System of Nature' the profoundest criticism, fused with the greatest injustice in the *naïf* self-consciousness of the poet's own activity, exhibits the sublime opposition of the young intellectual life of Germany to the apparent "decrepitude" of France.

The 'System of Nature' falls into two parts, of which the first contains the general foundations and the anthropology; the second, so far as this expression may be used, the theology. Already in the preface it is evident that

the real starting-point of the author is the effort to secure the happiness of mankind.

"Man is unhappy," the preface begins, "merely because he misunderstands nature. His mind is so infected by prejudices that one must almost believe him to be for ever doomed to error; the chains of illusion in which he is so entangled from childhood have so grown upon him, that he can only with the utmost trouble be again set free from them. Unhappily he struggles to rise above the visible world, and painful experiences constantly remind him of the futility of his attempts. Man disdained the study of nature to pursue after phantoms, that, like will-o'-the-wisps, dazzled him and drew him from the plain path of truth, away from which he cannot attain happiness. It is therefore time to seek in nature remedies against the evils into which fanaticism has plunged us. There is but one truth, and it can never harm us. To error are due the grievous fetters by which tyrants and priests everywhere succeed in enchaining the nations: from error arose the bondage to which the nations are subject; from error the terrors of religion, which brought about that men mouldered in fear, or fanatically throttled each other for chimeras. From error arose deep-rooted hatred and cruel persecutions; the continual bloodshed and the horrid tragedies of which earth must be made the theatre to serve the interests of heaven.

"Let us try, therefore, to banish the mists of prejudice, and to inspire man with courage and respect for his reason! If there is any one who cannot dispense with these delusions, let him at least allow others to form their own ideas in their own way, and let him be convinced that, for the inhabitants of earth, the important thing is to be just, benevolent, and peaceful."

Five chapters discuss the general principles of his view of nature. Nature, motion, matter, the regularity of events, and the nature of order and chance, are the subjects with which Holbach connects his fundamental propositions.

Among these chapters, it is the last especially which, by its absolute elimination of the last relic of theology, for ever separated the Deists from the Materialists, and which in particular stirred up Voltaire to violent attacks upon the 'System of Nature.'

Nature is the great whole of which man is part and by which he is influenced. The beings that we place outside nature have always been creatures of imagination, of whose character we can form an idea as little as of their abiding-place and modes of action. There does not and cannot exist anything beyond the sphere that includes all creatures. Man is a physical being, and his moral existence is only a special aspect of his physical nature, a particular mode of action due to his peculiar organisation.

Everything that the human mind has devised for the improvement of our condition is but a consequence of the reaction between his impulses and the nature that environs him. Even the animal proceeds from simple needs and forms to ever more complicated ones; and so also the plant. Imperceptibly the aloe grows through a series of years, until it at last produces the flowers that are the harbingers of its speedy death. Man, as a physical being, acts according to visible sensuous influences; as a moral being, according to influences which our prejudices will not permit us to recognise. Education is development; as, indeed, Cicero had already said—"Est autem virtus nihil aliud quam in se perfecta et ad summum perducta natura." All our inadequate ideas are due to want of experience, and every error involves injury. From defective knowledge of nature man has imagined deities that became the one object of his hopes and fears, without thinking that nature knows neither hate nor love, and works on and on, producing now weal now woe, according to invariable laws. The world shows us everywhere nothing but matter and motion. It is an endless chain of causes and effects; the most various elements are continually reacting on each other, and their different qualities

and combinations constitute for us the nature of individual things. Nature in the wider sense, then, is the combination of the different elements in individual things in general; in the narrower sense, the nature of a thing is the sum of its properties and modes of action. If, then, we say that nature produces an effect, we must not personify nature as an abstraction, but we mean only that the effect in question is a necessary result of the properties of some one of the things forming the great whole that we see.

In the theory of motion Holbach keeps close to the basis laid down by Toland in the essay we have mentioned already. He defines motion, indeed, badly,[84] but he treats it comprehensively and thoroughly, though without entering upon mathematical theories, just as in the whole work, agreeably to his practical aim, the positive and special treatment gives place to general and abstract considerations.

Everything is, in virtue of its peculiar nature, capable of certain movements. Thus our senses are capable of receiving impressions from certain objects. Of no body can we know anything unless it directly or indirectly produces a modification in us. Every movement that we perceive either removes a whole body to another place, or it takes place amongst the smallest particles of this body, and produces perturbations or changes that are perceptible to us only through the changed properties of the body. Movements of this kind are at the bottom of the growth of plants and animals and the intellectual activity of man.

The movements are called communicated if they are forced upon a body from without; spontaneous, if the

[84] The definition (chap. ii.) runs: "Le mouvement est un effort par lequel un corps change ou tend à changer de place." In this definition the identity of motion with the 'nisus' or 'conatus' of the theorists of the time, which Holbach tries to demonstrate in the course of the chapter, is already presupposed, which leads to the positing of a higher idea ("effort"), that at bottom includes the notion of motion, and moreover has an anthropomorphic tinge, from which the simpler idea of motion is free. Comp. the following note.

cause of movement is in the body itself. Amongst the latter are reckoned, in the case of man, walking, speech, thought, although we may find, on closer examination, that, strictly considered, there are no spontaneous movements. The human will is determined by external causes.

The communication of movement from one body to another is regulated by necessary laws. Everything in the universe is constantly in motion, and all rest is only apparent.[85] Even what physicists have called 'nisus' can only be explained by movement. If a stone weighing 500 pounds rests upon the earth, it is pressing every instant with its whole weight, and receives a corresponding pressure from the earth. One need only lay one's hand between them to discover that the stone shows sufficient force to crush it, in spite of its apparent rest. Action is never without reaction. The so-called dead forces and the living ones are therefore of the same kind, and only show themselves under different circumstances. Even the most durable bodies are subject to continual changes. Matter and motion are eternal, and creation out of nothing is an empty phrase. To go back to the origin of things is only to postpone our difficulties, and to withdraw them from the test of sense.

As to matter, Holbach is not a strict Atomist. He assumes, indeed, elementary particles, but declares the nature of the elements to be unknown. We know only some of their properties. All modifications of matter are a consequence of motion; this transforms the shape of things, dissolves their constituent parts, and forces them

[85] In this passage (p. 17 ff. of the edition, London, 1780) the author quotes Toland's 'Letters to Serena,' though he does not apply in all its precision Toland's theory of motion. Toland shows that 'rest' must not only be always understood relatively, but also that it is at bottom only a special case of motion, since just as much activity and passivity are involved when a body in the conflict of forces maintains its place for some time, as when it changes its place. Holbach only approaches to this end indirectly, and nowhere exactly hits the decisive point; whether because he had not conceived Toland's view in all its precision, or because he considered his own mode of treatment to be more popular.

to contribute to the development or conservation of things of quite different nature.

Between what are called the three kingdoms of nature there exists a continual exchange and circulation of material particles. The animal acquires new strength by the consumption of plants or of other animals; air, water, earth, and fire aid in its maintenance. But the same elements, under other forms of combination, become the cause of its dissolution; and immediately the same constituents are worked into new formations, or cause fresh destruction.

This is the invariable course of nature; this is the everlasting cycle that must be described by all existence. It is thus that motion originates the parts of the universe, maintains them for a time, and destroys them gradually, the one by means of the other; while the sum of existence remains always the same. Nature, in its combining activity, creates suns which become the centre of as many systems; she creates the planets which gravitate by their own nature, and describe their orbits round the sun. Very gradually motion changes the one and the other, and she will perhaps some day scatter again the particles out of which she formed the wondrous masses, of which man in his short span of life gets only a passing glimpse.[86]

While, however, Holbach thus in general principles is quite at one with our modern Materialism, he stands (and this is a proof how far these abstractions lay from the true path of natural science) in his views as to the changes of matter still quite on the old ground. With him fire is still the life-principle of things. As with Epikuros, as with Lucretius and Gassendi, so with him the fiery particles are in play in all the events of life, and, now visible, now concealed beneath the rest of matter, produce numerous phenomena. Four years after the 'System of Nature' appeared Priestley discovered oxygen, and while Holbach was still writing or discussing his principles with his

[86] Vol. i. ch. iii. p. 39, ed. 1780.

friends, Lavoisier was already working at that magnificent series of experiments to which we are indebted for the true theory of combustion, and at the same time for an entirely new foundation for that science of which Holbach too was a student. But the latter was content, like Epikuros, with the logical and moral results of previous inquiry, while the former was inspired by a scientic idea to which he dedicated his life.

In treating of the regularity of events, Holbach goes back to the fundamental forces of nature. Attraction and repulsion are the forces from which all combination and separation in bodies proceed; they are related to each other, as Empedokles had seen, like love and hate in the moral world. Even this combination and separation are regulated by absolute laws. Many bodies, which by themselves admit of no combination, may be brought to it by the mediation of other bodies. To be is only to move in a particular manner; to endure means to communicate or receive such movements as condition the continuance of individual existence. A stone resists decomposition merely by the cohesion of its particles; organised beings by complicated means. The impulse of self-preservation is called in physics durability, in morality self-love.

Between cause and effect rules necessity in the moral as in the physical world. The particles of dust and water in a tempest or a whirlwind move by the same necessity as an individual in the stormy movements of a revolution.[87]

Holbach died the 21st June 1789, a few days after the deputies of the 'Tiers État' had constituted themselves a National Assembly. The Revolution, which drove his friend Grimm back to Germany, and often enough involved Lagrange in danger of his life, was on the point of being realised when he departed who had so powerfully prepared the way for it by teaching that it must be regarded as a natural and necessary event.

[87] Vol. i. ch. iv. p. 52, ed. 1780.

Of especial importance is, finally, the chapter on Order, against which Voltaire directed his first bitter attack.[88] Voltaire is here, as so often, the representative of the ordinary common sense, which, with its inarticulate prejudices and vulgar declamation, is absolutely valueless as compared with even the lowest form of philosophical thought. Nevertheless it will serve our purpose for once to balance arguments and counter-arguments, in order to show that to get beyond Materialism far other means are needed than those that were at the disposal even of the acute and skilful Voltaire.

Originally, says the 'System of Nature,' the word order meant merely the way in which we easily embrace in its individual relations a whole whose forms of existence and operation offer a certain correspondence with our own. (We note the familiar anachronism which regards the *stricter* conception as the *original* one, though in reality it is only later developed.) Man has proceeded to impose his own peculiar mode of thought upon the external world. But since in the world everything is equally necessary, there cannot in nature be any possible distinction between order and disorder. Both conceptions belong only to our reason; and, as with all metaphysical notions, there is nothing corresponding to them outside ourselves. If, nevertheless, we wish to apply these notions to nature, we can only mean by order the regular succession of phenomena which is the result of invariable natural laws; while disorder remains a relative notion, embracing only those phenomena by which an individual thing is disturbed as to the form of its existence, although there is no disturbance at all, looking from the standpoint of the great whole. There is in nature no such thing as order or disorder. We find order in everything that is conformable to our

[88] Comp. the article 'Dieu, Dieux,' in the 'Dict. Philos.,' reprinted in the collected edition of Voltaire, and, under the title 'Sentiment de Voltaire sur le Système de la Nature,' with a different arrangement of the sections, in the 1780 edition of the 'Système de la Nature.'

nature; disorder in all that is contrary to it. The immediate result of this view is that there can be no such things in nature as miracles. In exactly the same way we create within ourselves the notion of an intelligence acting with purpose, and its antithesis, the notion of chance. The whole can have no purpose, because outside it there is nothing at which it could aim. We regard as intelligent such causes as operate after our manner, and consider the operation of others as a play of blind chance. And yet the word chance has a meaning only as opposed to that intelligence the idea of which we have drawn from ourselves. But there are really no blindly operating causes, but we are ourselves blind, since we misunderstand the forces and laws of nature, whose effects we attribute to chance.

Here we find the 'System of Nature' quite in the paths prepared by Hobbes with his vigorous Nominalism. It is obvious that the notions of Good and Bad, although Holbach has forborne to develop them, must also be regarded as merely relative and subjective, like those of order and disorder, intelligence and chance. From this point no retreat is possible; for the demonstration of the relativity of these notions and their foundation in human nature remains the irrevocable first step to a purified and thorough science; the way of advance is of course still open. It is by way of the doctrine of the origin of these ideas in the human organisation that the path lies that leads us beyond the limits of Materialism: on the other hand, the positions of the 'System of Nature' stand immovably firm against any opposition based upon vulgar prejudices. We attribute to chance those effects whose connection with their causes we cannot see; order and disorder are not in nature.

What is Voltaire's answer to this? Let us hear him. We will take the liberty of answering him in the name of Holbach.

"What! in the physical world is a child born blind or without legs, an abortion, not against the nature of the race? Is it not the usual regularity of nature that consti-

tutes order, and its irregularity that constitutes disorder? Is not a child to whom nature has given hunger but closed its œsophagus a violent disorder and a fatal irregularity? Evacuations are necessary, and yet the proper channels often lack an opening, so that surgical aid is necessary. This disorder has doubtless its cause: there is no effect without cause; but still this effect is a great violation of order."

It cannot, indeed, be denied that, to our common unscientific modes of thought, an abortion does violence to the nature of the race; but what else is this 'nature of the race' than an empirical human idea, that for objective nature has no binding force, and indeed no meaning? It is not enough to admit that the effect which, in its intimate relations to our own sensations, appears a disorder has a cause; we must also admit that this cause stands in a necessary and immutable connection with all the other causes in the universe; and that the one great whole, in the same way and by the same laws, in most cases produces the complete organisation, and in some cases the incomplete. But looked at in connection with the great whole—and this is what Voltaire should have done if he wished not to be unjust—it is impossible to regard as disorder what is merely a result of its eternal order, that is, of its regular course; while the 'System of Nature' never denied that such phenomena present to sensitive, sympathising men the appearance of frightful irregularity. So that Voltaire has proved nothing but what was conceded from the first, and has not so much as touched the core of the question. But let us see whether he proves more in the case of the moral world.

"The murder of a friend, of a brother, is that not a frightful disorder in the moral sphere? The calumnies of Garasse, of Tellier, of Doucin against the Jansenists, those of the Jansenists against the Jesuits; the trickeries of Patouillet and Paulian, are they not small disorders? The Bartholomew Massacre, the butcheries in Ireland,

&c., &c., are they not accursed disorders? These transgressions have their causes in the passions, but their effect is abominable: the cause is fatal; this cause makes us shudder."

Murder is indeed a thing at which man shudders, and which he regards as a frightful violation of moral order. And yet we may reach the view that these complications and passions in which crime originate are only necessary aspects of human impulses and activities, as shadows are inseparable from light. We shall be absolutely obliged to admit this necessity as soon as we cease to play with the idea of cause, and seriously admit that even human actions to each other and to the sum of nature stand in a complete and effectual causal relation. For then we shall find here, too, as well as in the physical sphere, a common foundation—nature itself—indissolubly bound together by a causal connection in all its parts, which acts according to eternal laws, and produces in the same order virtue as well as crime, and as well horror of crime as the conviction that the idea associated with this horror, of a violation of order, is a merely one-sided and inadequate human conception.

"We have only to show the origin of this disorder, which actually exists."

The origin lies in human conceptions; there indeed the idea of disorder exists, but Voltaire has proved nothing more. But the inaccurate and illogical human understanding, even though it be that of the ablest of men, has at all times confounded its own empirical conceptions with the nature of things in themselves, and will probably continue to do so.

Without entering here into a deeper criticism of Holbach's standpoint—a criticism which will indicate itself in the course of our work—we will only point out that the Materialists, in their victorious demonstration of the uniformity of nature, confine themselves to this range of ideas with a one-sidedness that seriously hinders the due appreciation of the intellectual life, in so far as merely

human ideas play a legitimate part in it. Because the critical understanding refuses the title of objectivity claimed for the ideas of teleology, of intelligence in nature, of order and disorder, and so on, it too easily results that the value of these ideas to mankind is too much depreciated, even when they are not wholly rejected. Holbach, it is true, recognises a certain justification for these ideas: man may avail himself of them if he is not enslaved to them, and if he knows that he has to do, not with objective things, but with inadequate conceptions of them. But that such ideas, although in no way answering to the things in themselves, must in extensive spheres of life not only be suffered as convenient and harmless habits of childhood, but that they belong in spite of, nay, perhaps, *because* of, their birth in the mind of man to the noblest treasures of mankind, and can afford him a felicity which nothing can replace, these are considerations far removed from the Materialist; and they are indeed removed from him, not because they would be inconsistent with his system, but because the modes of thought engendered in him through struggle and labour carry him away from this aspect of human life.

And from this too it results that Materialism is not only more dangerous in a struggle with religion than other weapons, but that it shows itself more or less hostile also to poetry and to art, which have, however, the advantage, that in them the free creativeness of the human mind as opposed to reality is openly conceded, while in the dogmas of religion and the architectural constructions of metaphysic it is intimately associated with false pretensions to objective truth.

There are therefore deeper aspects of the relation of religion and metaphysic to Materialism which will later display themselves. Meanwhile let us take a side glance at the subject of art in relation to the chapter on order and disorder.

If order and disorder do not exist in nature, then also

the antithesis of the Beautiful and the Ugly rests merely upon human ideas. The circumstance that this thought is always present to the Materialist easily estranges him to some extent from the sphere of the Beautiful; the Good is nearer him, the True nearest of all. If, then, a Materialist undertake the function of judge in art, he will necessarily be more inclined than another critic to emphasise natural truth in art, but to ignore and depreciate the ideal and the strictly beautiful, especially when they conflict with natural truth. Thus, then, we find also Holbach almost without sense for poetry and art; at least he betrays none in his writings. Diderot, however, who took up art criticism at first against his will, but later with extraordinary zeal, exhibits in a surprising way the influence of Materialism upon the appreciation of the Beautiful.

His "Essay on Painting" is, with Goethe's masterly remarks, in everybody's hands. With what tenacity Goethe insists upon the ideal aim of art, while Diderot obstinately seeks to make the idea of the consistency of nature the principle of the fine arts! There are no such things as order and disorder in nature. From nature's standpoint (if only our eye could trace out the subtle features of a logical whole), is not the figure of a hunchback as good as that of a Venus? Is not our idea of beauty at bottom a mere human limitation? In developing more and more widely this thought, Materialism diminishes our pure joy in beauty and the sublime influence of the ideal.

The fact that Diderot was by natural disposition an Idealist, and that we accordingly find in him expressions of the distinctest Idealism, only shows more clearly the influence of the Materialistic ideas, which again against his will carry him away. Diderot goes so far as to deny that the ideal, 'the true contour,' can be found by an empirical combination of the most beautiful parts that nature presents. It springs from the mind of the great artist as an archetype of the really beautiful, from which nature always

and in all parts is removed by the pressure of necessity. This thesis is as true as the assertion that nature in the structure of a hunchback or a blind woman follows out to the very toes the consequences of the defect once given, with a delicacy that the greatest artist could not attain. But what is not true is the combination of these two propositions by the remark that we should need no ideal, that we should find the highest satisfaction in the immediate copying of nature, if we were only in a condition to penetrate the whole system in its logical connection.[89] It is true that, if we push the matter to extremities, it may be asked, whether for *absolute* knowledge—that sees in a fragment its relations to the whole, and for which therefore every intuition is an intuition of the universe—whether for such knowledge there can be any beauty at all apart from reality? But Diderot does not look at it in this way. His proposition must admit of a practical application for the artist and art critic. It must also be maintained, then, that the deviations from the 'true contour' of the ideal are admissible—nay, as compared with the merely normal, constitute the true ideal—so far as we succeed in bringing them out, at least in sentiment, in their unity and consistency. But then the ideal loses its independence. The beautiful is subordinated to the true, and thus loses its own special significance.

If we wish to avoid this mistake, we must above all regard ethical and æsthetic ideas as themselves necessary

[89] Essai sur la Peinture, i. : "Si les causes et les effets nous étaient évidents, nous n'aurions rien de mieux à faire que de représenter les êtres tels qu'ils sont. Plus l'imitation serait parfaite et analogue aux causes, plus nous en serions satisfaits." Œuvres Compl. de Diderot, iv. 1 part., p. 479 (Paris, 1818). Rosenkranz, to whom we are indebted for his energetic reference to Diderot's Idealism (comp. especially Diderot, ii. 132 ff., the passages taken from the Letter to Grimm on the *Salon* of 1767, Œuvres, iv. 1, p. 170 ff.), has not sufficiently weighed this important passage in his account of the argument of the 'Essai sur la Peinture' (Diderot, ii. 137). There is no course open but either to suppose Diderot to be here contradicting himself, or to combine the superiority of natural truth to beauty here taught with the theory of the 'true contour' in the mode adopted in the text.

products of the general forces of nature, developed according to eternal laws in the special province of the human spirit. Human speculations and endeavours beget the idea of order as they beget the idea of beauty. Then comes the philosophy of nature and destroys it; but from the hidden depths of the soul it ever springs forth again. In this struggle of the creative and the critical faculty, there is nothing more unnatural than in any other contest of the forces of nature, or in that war of extermination between living creatures battling with one another for existence. We must, indeed, from the most abstract standpoint, deny that there is error any more than disorder. Error, too, arises from the strictly ordered reaction between the individual with his organs and the impressions of the external world. Error is, like better knowledge, only a mode or fashion in which the things of the external world project themselves, as it were, in man's consciousness. Is there any absolute knowledge of things in themselves? Man at least does not seem to possess it. If, however, there exists a higher knowledge answering to his nature, as compared with which ordinary error—though it too is a mode of knowledge depending upon law—may yet be described merely as error, that is, as a condemnable deviation from this higher mode of knowledge; in that case will there not also be an order based upon the nature of man that deserves something better than to be placed upon one and the same level with its opposite disorder, that is, just those kinds of order that deviate and are entirely opposed to human nature?

Although the style of the 'System of Nature' is prolix and full of repetitions, yet it contains many discussions that partly deserve notice for their vigour and soundness, but partly are particularly suited to exhibit in a clear light the narrow limits in which the materialistic philosophy moves.

While Lamettrie took a malicious delight in giving himself out as a Cartesian, and affirming, perhaps in good

faith, that Descartes had explained man on mechanical principles, and had only attached a soul to the machine to please the parsons, Holbach, on the contrary, makes Descartes chiefly responsible for the dogma of the spirituality of the soul. "Although even before him the soul had been conceived to be spiritual, yet he is the first who laid down the principle that the thinking nature must be distinct from matter, and from this concludes that the thinking element in us is a spirit, that is, a simple and indivisible substance. Would it not be more natural to conclude: Because man, a material being, does actually think, it follows that matter is capable of thinking? Leibniz comes off no better with his pre-established harmony, or even Malebranche, the inventor of Occasionalism. Holbach does not take the trouble to refute these men thoroughly; he is content with pointing out continually the absurdity of their principles. From his point of view, not unreasonably; for if one fails to appreciate the effort of these men to shape the ideas that lived in them, if one submits their systems to a strict logical examination, then, in truth, no expression of contempt can be strong enough to characterise the shallowness and frivolity with which these much-admired philosophers laid the foundations of their systems upon absolute nothingness. Holbach sees everywhere only the influence of theology, and ignores the metaphysical instinct, which seems to lie quite as deep in our nature as, for instance, the feeling for architecture. "It must not surprise us," thinks Holbach, "to see the ingenious and unsatisfying hypotheses in which the deepest thinkers of modern times, driven by theological prejudices, are obliged to take refuge whenever they attempt to reconcile the spiritual nature of the soul with the physical influence of material things upon this immaterial substance, and to explain the reaction of the soul upon these things, as well as generally its union with the body." Only a single spiritualist offers him any difficulty, and here we recognise the fundamental

problem to which our whole investigation is bringing us. It is Berkeley, who, as a bishop of the Church of England, was certainly led by theological prejudices more than Descartes and Leibniz, and yet who reached a philosophy more logical, and in principle further from ecclesiastical dogma, than both of them.

"What shall we say of a Berkeley, who tries hard to convince us that everything in the world is but a chimerical illusion, and that the whole universe exists only in ourselves and in our imagination, and who makes the existence of everything doubtful by the help of sophistries that are insoluble for all those who maintain the spirituality of the soul?" How those who are not keen to maintain an immaterial soul are to dispose of Berkeley, Holbach has forgotten to set forth; and in a note he confesses that this, the most extravagant of systems, is almost the most difficult to refute.[90] Materialism obstinately takes the phenomenal world for the world of realities. What weapons has it against him who attacks this main standpoint? Are things as they seem? *Are* they at all? These are questions that continually recur in the history of philosophy, and to which only the present can give a half-satisfactory answer—an answer, indeed, which adopts neither extreme.

Holbach devoted special and obviously conscientious pains to the foundations of Ethic. We shall, indeed, find hardly a single idea that had not already made itself heard in Lamettrie; but what in him is casual, carelessly thrown out and mixed with frivolous remarks, meets us in Holbach purified, methodised, and systematically developed, with rigid avoidance of all that is mean and vulgar. Like

[90] Syst. de la Nat., i. c. x. p. 158 ff., ed. 1780. We may point out here, in view of the recent very extravagant over-estimate of Berkeley, that the "irrefutableness" of his system only extends so far as it denies the existence of a physical world different from our ideas. The conclusion that there is a spiritual, incorporeal, and active substance which is the cause of our ideas, is as full of flat and palpable absurdities as any metaphysical system whatever.

Epikuros, Holbach made durable felicity, and not transient pleasure, the aim of human effort. The 'System of Nature' contains also an attempt to base morality upon physiology, and in connection with this an energetic assertion of the civic virtues.

"If we were to consult experience instead of prejudice, medicine could solve for morality the riddle of the human heart, and we might be assured that sometimes she would cure the mind by curing the body." It was only twenty years later that the noble Pinel, a physician of Condillac's school, founded the modern 'psychiatry,' which by degrees brought us, to the great alleviation of the most terrible of human sufferings, to tend the insane with benevolence, and to recognise insanity in a large proportion of criminals. "The dogma of the immortality of the soul has made morality into a science of conjectures, which teaches us nothing at all of the true means to influence mankind. If, aided by experience, we knew the elements that formed the basis of the temperament of an individual, or of the majority of the individuals in a nation, we should know what is suited to them—what laws are necessary, and what institutions useful for them. In a word, morality and politics might derive advantages from Materialism that the dogma of an immaterial soul can never give them, and which it prevents us even from thinking of."[91] This idea of Holbach's has still its future before it; only that probably, to begin with, statistics will do more for morals than physiology.

All the moral and intellectual faculties are derived by Holbach from our sensibility to the impressions made by the external world. "A sensitive soul is nothing but a human brain so constituted that it easily receives the motions communicated to it. Thus we call him sensitive who is moved to tears by the sight of an unhappy creature, or the account of a terrible accident, or the mere idea of an afflicting scene." Here Holbach stood at the very threshold

[91] L., c. ix.; ed. 1780. i., p. 124.

of a materialistic moral philosophy, in which we are still lacking, and whose development we must desire, even though we have no idea of remaining at the materialistic standpoint. What is needed is to find the principle that will carry us beyond Egoism. Pity, indeed, is not enough; but if we include sympathetic pleasure, and extend our view so as to take in all the natural sympathy felt by all the finer organisation with the beings whose likeness to himself he recognises, we have then already a foundation upon which we may at all events build up something like a proof that the virtues also find their way insensibly into man through eyes and ears. Without venturing, with Kant, upon the decisive step that inverts all the relations of experience to man and his ideas, we might yet find a solid basis for this ethical theory, by showing how, through the mediation of the senses, there is gradually formed in the lapse of thousands of years a community amongst mankind, resting upon this fact, that every individual shares in the fortunes of the race through the harmony, or want of harmony, in his own sensations and ideas.

Instead of following out this natural succession of ideas, Holbach, after some discussions reminding us strongly of Helvetius on the nature of mind (*esprit*) and of imagination, proceeds to deduce morality from the purely rational recognition of the means to happiness—a proceeding which reflects the unhistorical and generalising spirit of the previous century.

The political passages of the work are undoubtedly more important than is commonly supposed. They are so distinctly marked by a firm, complete, and thoroughly radical theory—they conceal, often beneath the appearance of a magnanimous objectivity or philosophical resignation, such an embittered hatred of the existing order, that they must have exercised a profounder influence than long tirades of brilliant and passionate rhetoric. They would doubtless have been more regarded if they were not brief and scattered.

"As government only derive its powers from society, and is established only for its good, it is evident that society may revoke this power when its interests demand, may change the form of government, extend or limit the power intrusted to its leaders, over whom it retains a supreme authority, by the immutable law of nature that subordinates the part to the whole." This passage, from the (ninth) chapter on the foundations of morality and politics, gives the general rule: does not the following passage from the (eleventh) chapter on the freedom of the will contain a clear indication of its applicability to the present? "We only see so many crimes on earth, because everything conspires to make men criminal and vicious. Their religions, their governments, their education, the examples before their eyes, all drive them irresistibly to evil: in vain, then, does morality preach virtue which would only be a painful sacrifice of happiness in societies where vice and crime are perpetually crowned, honoured, and rewarded, and where the most frightful disorders are only punished in those who are too weak to have the right to commit them with impunity. Society chastises in the small the excesses that it respects in the great, and often is unjust enough to condemn to death those whom the prejudices that it maintains have rendered criminal."

What distinguishes the 'System of Nature' from most materialistic writings is the outspokenness with which the whole second part of the book, which is still stronger than the first, in fourteen elaborate chapters combats the idea of God in every possible shape. Almost all the materialistic literature, ancient and modern, had ventured upon this conclusion either timidly or not at all. Even Lucretius, who holds the deliverance of mankind from the fetters of religion to be the most important basis of moral regeneration, at least allows certain phantom deities to lead an enigmatical existence in the interspaces of the universe. Hobbes, who certainly came very near in theory to open Atheism, would in an atheistic state have had any citizen

hung who taught the existence of God; but in England he recognised all the articles of the Anglican Church. Lamettrie, who spoke out indeed, but not without circumlocution and equivocation, devoted all his efforts to anthropological Materialism only: Holbach is the first who appears to regard the cosmological doctrines as most important. If you look into the matter, it is true that Holbach, like Epikuros, seems to be led chiefly by practical considerations. Regarding religion as the chief source of all human corruption, he tries to eradicate all foundation for this morbid tendency of mankind, and therefore pursues the deistic and pantheistic ideas of God, that were yet so dear to his age, with no less zeal than the ideas of the Church. This circumstance it is, no doubt, that made such violent enemies of the 'System of Nature,' even amongst the freethinkers.

At the same time, it must be admitted that the chapters directed against the existence of God are for the most part excessively tedious. The logical constructions that are supposed to represent proofs for the existence of God are so utterly vague and misty, that the question of their acceptance or rejection is only a matter of more or less self-deception. The man who clings to the proofs only gives a scholastic expression to his inclination to believe in a God. This inclination itself, long before Kant struck out this method of basing the notion of God, was always merely an outflow of moral activity, or of the life of the emotions, but not of theoretical philosophy. The scholastic fondness for idle disputation may indeed find satisfaction in the discussion of such propositions as these: 'The self-existent being must be infinite and omnipresent,' or, 'The necessarily existent being must necessarily be but one;' but it is impossible to find in such vague conceptions any starting-point for a serious investigation worthy of the human mind. What can we say, then, when a man like Holbach devotes nearly fifty pages of his work merely to Clarke's proof for the existence of God—a proof that deals

throughout in propositions to which, from first to last, it is impossible to attach a definite sense? With touching conscientiousness, the 'System of Nature' tries to fill the cask of the Danaides. Proposition after proposition is pitilessly taken up and dissected, only to return continually to the same simple principles, that no reason can be found for believing in a God, and that matter has existed from all eternity.

Holbach, indeed, knew quite well that he was combating, not an argument, but hardly the shadow of an argument. He shows in one place that Clarke's own definition of Nothing absolutely coincides with his definition of the idea of God, which contains only negative predicates. In another place he remarks, that it is commonly said that our senses show us only the rind of things; but that in the case of God they don't show us even that. But the following observation is specially to the point:—

"Dr. Clarke tells us it is enough that the attributes of God are possible, and so that we cannot prove the contrary. Singular logic! Theology in that case would be the only science in which we may conclude that a thing *is* because it is possible."

Might it not have occurred to Holbach here how it is possible that people of passably healthy brain, and who are not particularly vicious, can content themselves with assertions so completely built in the air? Might this not have led him to the view that the self-delusion of man in religious doctrines is, after all, something different from ordinary delusions? In external nature Holbach could not see even the rind of a God. But what if these very baseless proofs are a fragile rind, beneath which lurks an idea of God more deeply founded upon the faculties of the human spirit? But for this he would have needed at the same time a juster appreciation of religion in regard to its value as a moral and civilising element; and this is what has least to be expected from the ground out of which grew the 'System of Nature.'

How blunt is the attitude of the 'System of Nature' towards the idea of God is best shown by the chapter on Pantheism (Part. ii. c. iv.). If we remember that for a long time Spinozist and Materialist were considered synonymous, and that both views were frequently included under the term Naturalism, and, in fact, that we frequently find a pantheistic turn in men who are reckoned the leaders of Materialism, we may be surprised at the zeal shown by Holbach to banish the very name of a God, even though it be regarded as identical with nature, from the sphere of human thought. And yet Holbach, from his own point of view, by no means goes too far. It is precisely the mystical tendency in man's nature that he regards as the disease that causes the greatest evils that afflict humanity. And in truth, as soon as an idea of God is given at all, however it is based and carefully defined, the human heart will seize upon it, will give it poetic shape and personification, and will dedicate to it some kind of worship and adoration, the influence of which will henceforth be almost entirely independent of the logical and metaphysical origin of the idea. If this tendency to religion, which continually breaks through the limits of logic, is of less value even than poetry; nay, if it is rather absolutely hurtful, then indeed we must get rid of the very name of a God, and in this elimination only lies the keystone of a philosophy truly representing nature. Even then, however, we must charge Holbach with a slight rhetorical weakness, that might perhaps have dangerous consequences, when he talks of the true cultus of nature and of her altars!

Yet how often extremes meet! The same chapter in which Holbach summons his readers to free humanity for ever from the phantom of the Deity, and to abolish even his name, contains a passage that represents the tendency of man to the supernatural as so universal, so deeply rooted, so irresistible, that it is impossible to regard it as a passing disease of human nature; but we must actually suppose a fall of man (in the reverse sense) in

order to avoid the conclusion that this tendency to the supernatural is just as natural to man as the love of music and of beautiful colours and forms, and that a struggle against the natural law that makes this so is absolutely inconceivable.

"Thus men ever prefer the marvellous to the simple, what they do not understand to what they can understand. They despise familiar things, and only value those they are not able to appreciate. Though of these they have only vague ideas, they conclude that they possess something important, supernatural, divine. In a word, they need the stimulus of the mysterious in order to excite their imagination, to occupy their mind, and sate their curiosity, which is never keener than when it is engaged upon riddles that it is impossible to answer."

In a note to this passage it is pointed out that several nations have gone over from an intelligible deity, the sun, to an unintelligible one. Why? Because the most hidden, most mysterious, unknown God is always more pleasing to the imagination than a visible being. All religions, therefore, employ mysteries, and—in this lies the secret of priestcraft. Again, the priests are suddenly made responsible, though it would have been more reasonable to conclude that this class in the beginning sprang naturally from the popular need of mystery, and that, in spite of increasing intelligence, it cannot raise the people to purer views, just because this natural impulse to the mysterious remains too powerful. So we see that here, too, in this most radical attack upon all prejudices, a very important part is played by prejudice itself.

The same thing appears again especially in the chapters devoted to the relation between Religion and Morality. Far from adopting a merely critical treatment, and combating the prejudices that make religion the only basis of moral conduct, the 'System of Nature' goes on to show the moral hurtfulness of the positive religions, and especially of Christianity. Here, it is true, dogma and history

alike afford him numerous instances, but the treatment is nevertheless essentially superficial. Thus, for instance, it is treated as morally hurtful that religion promises pardon to the bad, while it overwhelms the good by the superfluity of its demands. The former, therefore, are encouraged, the latter disheartened. But what reaction this weakening of the old antithesis of 'the good' and 'the bad' must have exercised upon humanity in the course of thousands of years the 'System of Nature' has not taken into consideration. And yet a genuine system of nature ought to show us how false is this sharp antithesis, and how it leads to the deeper depression of poverty, to the degradation of weakness, to the mistreatment of disease, while the equalisation of faults, as it has been laid down by Christianity, coincides exactly with the principles to which the exact study of nature, and especially the abolition of the idea of free-will, must lead us. The 'good,' that is, the fortunate, have always tyrannised over the unfortunate. Indeed, in this matter, medieval Christianity is in the same position as Paganism, and it is only the enlightenment of modern days that has brought a distinct improvement. The historical inquirer will have to ask himself seriously, whether the principles of Christianity, after struggling for thousands of years in a mythical form against the brutality of men, are not at length exercising most influence in the moment when their form may disappear, because men have become riper for pure ideas. As to religious forms in themselves, especially as to that tendency of the mind to worship and ceremony, or to emotional processes that unsettle and disorganise, which has been so often confounded with religion, it may be seriously questioned whether the resulting feebleness and sensuousness, combined with the suppression of guiding sense and with the corruption of the natural conscience, are not often exceedingly pernicious to individuals as well as to populations. At least the histories of lunatic asylums, the annals of criminal law, and the statistics of morality supply us with facts that may per-

haps be some day collected into practical demonstration. Holbach knows little of this. He goes to work not empirically, but deductively, and all his theories as to the effect of religious views presuppose an adjustment of dogmas by mere reason. The result is, of course, that the results of his discussion remain extremely inadequate.

Much more pertinent and profound are the chapters in which he proves the existence of Atheists, and that Atheism is compatible with morality. Here he relies upon Bayle, who was the first to maintain expressly that the actions of man spring not from their general ideas, but from their passions and impulses.

Not without interest, finally, is the treatment of the question whether a whole people can profess Atheism. We have repeatedly pointed out the democratic tendency of French Materialism, as opposed to the influence of this philosophy in England Holbach is certainly not less revolutionary than Lamettrie and Diderot; how comes it, then, that the man who took so much pains to be popular, by whom, in an excerpt from his chief work, Atheism was "accommodated to chambermaids and hairdressers," as Grimm put it, nevertheless declares quite plainly that "these ideas are not suited for the mass of the people"? Holbach, who, because of his radicalism, was as good as shut out from the brilliant circles of the Parisian aristocracy, does not share the uncertainty of many writers of that age, who work with all their might to overturn the existing order, and yet play the part of aristocrats, despise the stupid peasants, and are ready to invent a God for them if need be, in order that a bugbear may not be lacking to keep them in awe. Holbach starts from the principle that the truth can never be injurious. He derives this from the wider proposition that theoretical principles, even though they may be wrong, can never be dangerous. Even the errors of religion receive their sting only through the passions that unite with them and the secular power that despotically maintains them. The most extreme opinions

can exist side by side if no attempt be made to secure by violent means exclusive dominance for any of them. Atheism, however, which bases itself upon the knowledge of natural laws, cannot become universal simply because the great mass of mankind have neither time nor inclination to attain to an entirely new set of ideas by means of this serious study. The 'System of Nature' is, however, far from leaving religion to the mass of mankind as a substitute for philosophy. As it demands absolute freedom of thought and entire indifference on the part of the state, it proposes to leave the souls of men to a natural course of development. Let them believe what they will and learn what they can! The fruits of philosophical inquiry will sooner or later benefit all, just as is already the case with the results of the natural sciences. The new ideas will, indeed, experience violent opposition, but men will gradually learn by experience that they bring only blessings. But in their propagation we must not limit our view to the present; we must embrace the future and all mankind. Time and the progress of ages will one day enlighten even those princes who now so obstinately oppose truth, justice, and the liberty of man.

The same spirit animates the final chapter of the whole work, in which we seem to trace the inspired pen of Diderot. This 'Sketch of the Code of Nature' is no dry and arid catechism, such as the French Revolution created on Holbach's principles, but rather a rhetorical showpiece, in many respects one may say a masterpiece. In a long passage Nature appears discoursing, as in Lucretius. She invites mankind to obey her laws, to enjoy the happiness that is allotted them, to serve virtue, to disdain vice, though not to hate the vicious, but rather to pity them as unfortunate. Nature has her apostles, who are unremittingly engaged in promoting the happiness of the human race. Even though their efforts do not succeed, they will at least have the satisfaction of having ventured the attempt.

Nature and her daughters, Virtue, Reason, and Truth, are finally invoked as the only deities, to whom alone belong incense and adoration. Thus by a poetic impulse the 'System of Nature,' after having destroyed all religions, becomes itself a religion. May this religion also some day produce an ambitious priesthood? Is the tendency of man to mysticism so great that the principles of the work which rejects even Pantheism, in order to eradicate even the name of the Deity, may become the dogmas of a new church, which will succeed in skilfully mingling the intelligible with the unintelligible, and creating ceremonies and forms of worship?

Where does nature produce the unnatural? How can the eternal necessity that governs all development produce perversity and wrongness? Upon what rests our hope of a better time? What shall restore nature to her rights if there is nowhere anything but nature? These are questions to which the 'System of Nature' gives us no sufficient answer. We have attained to the perfection of Materialism, but also to its limits. What the 'System of Nature' gives us in strict co-ordination, recent times have again scattered and dispersed in many ways. New motives, new points of view have been attained in plenty; but the circle of fundamental problems has remained invariably the same,—the same as, in truth, it already was in Epikuros and Lucretius.

CHAPTER IV.

REACTION AGAINST MATERIALISM IN GERMANY.

We have seen how early Materialism took root in Germany; but it was in Germany also that a very important reaction against this tendency appeared, extending through a great part of the eighteenth century, which we must not omit to consider. At the very beginning of the century the philosophy of Leibniz became popular, the essential features of which result in a splendid effort to get rid of Materialism at a single stroke. None can fail to recognise the relationship of the monads with the atoms of the physicists.[92] The expression 'principia rerum' or 'elementa rerum,' applied by Leibniz to the atoms, would equally well stand for a wider notion which should include the atoms and the monads. It is true that Leibniz's monads are the primary existence, the true elements of things in his metaphysical world, and it has long been admitted that the God adopted into his system as the 'sufficient cause of the monads' plays at least as unnecessary a part as do the gods of Epikuros with their shadowy existence in the interspaces of the worlds.[93] Leibniz, a

[92] Zeller, Gesch. d. deutschen Phil., München, 1873, explains (p. 99 ff.) the influence of Atomism upon Leibniz, and then observes: "He now turns from the atoms to the substantial forms of Aristotle, in order to produce his atoms from both;" and *loc. cit.*, p. 107, "in the place of material atoms appear intellectual individuals, in the place of physical 'metaphysical points.'" Leibniz himself calls the monads "formelle Atome." Cf. Kuno Fischer, Gesch. d. n. Phil., ii. 2d ed., p. 319 ff.

[93] That the view of the incompatibility of Leibniz's theology with the philosophical principles of his system was very widely spread (and not expressed by Erdmann alone, cf. Schilling, Beitr. zur Gesch. d. Mat., S. 23)

diplomatist and a universal genius, and yet a man, as

is expressly shown by Kuno Fischer (Gesch. d. neueren Phil., ii. 2 Aufl., S. 627 ff.), who at the same time strongly combats the view. His proof to the contrary rests upon the necessity of a supreme monad, which is consequently named the 'absolute' or 'God.' It is admitted that the system presupposes a supreme monad, but not that this monad, so far as it is really conceived in accordance with the principles of the system, can take the position of a God maintaining and governing the world. The monads are developed by a strict necessity, according to the forces inherent in them. None of them can, either in the sense of ordinary causality or in that of pre-established harmony, become the productive cause of the rest. Even the pre-established harmony does not produce the monads, but only determines their condition, in precisely the same way as, in the system of Materialism, the universal laws of motion determine the condition, that is, the relations in space, of the atoms. And it is easy to see that it is a mere logical consequence of Leibniz's Determinism to break off here the causal series, instead of setting up another 'sufficient reason' for the monads and the pre-established harmony, which reason has no other purpose than just to be this sufficient reason. Newton at least gave his God some driving and cobbling tools; a reason that has no object but to be the reason of the ultimate reason of the world is as superfluous as the tortoise that supports the earth, and immediately suggests the further question, What, then, is the sufficient reason of this God? Kuno Fischer tries to escape this inevitable consequence by deriving, not the condition of the monads from the pre-established harmony, but this latter from the monads. "Sie folgt nothwendig aus den Monaden, weil sie ursprünglich darin liegt" (*l. c.*, S. 629). This is a simple inversion of the identical proposition; the pre-established harmony is the pre-determined order in the condition of the monads. This affords not the least ground for the necessity of deriving all the other monads from the most perfect. The fact that this affords the *explanation* of the condition of the rest (in itself not an incontestable proposition) does not make it the real cause, and, even if this were so, there might result indeed, in a certain sense, an 'extra-mundane' God, but not one that could be of use to religious Theism. Zeller has rightly observed (Gesh. d. deutschen Phil., S. 176 ff.), "It would not be very difficult to show that the Leibnizian, like all theological Determinism, if logically developed, would carry us beyond the theistic standpoint of its author, and would compel us to find in God not the creator only, but the substance of all finite beings." And this not difficult demonstration is a part of the necessary criticism of the system of Leibniz, all the more because a mind like Leibniz's must itself have made this discovery even after Descartes, Hobbes, and Spinoza. The one point that seems necessarily to connect God with the universe is the doctrine of the choice of the 'best' world from an infinite number of possible worlds. But here we may refer to the thorough treatment of the matter, with reference to the sources, in Baumann, Die Lehren von Raum Zeit u. Mathematik, Berl. 1869, ii. 280 ff., where it is shown that we may conceive the eternal essences of things, in whose nature God can alter nothing, just as well as eternal forces, by whose actual strife is attained that minimum of reciprocal constraint which Leibniz brings about by the (necessary!) choice of God. The logical consequences of his mathematical conception of the world lead to the eternal predestination of all things

Lichtenberg [94] happily says, who "had little stability," could with equal facility plunge into the abysses of the most profound speculations, or in the shallow water of everyday discussion avoid the rocks which practical life throws in the steady thinker's way. It will be vain to attempt to explain the contradictions of his system merely from the desultory form of his occasional productions, as though that great genius had preserved in his own mind a perfectly clear system, as though he had only by chance omitted to give us an explanation which would supply us at once with a key to all the puzzles of his writings. These contradictions are there; they are indeed proofs of weaknesses of character, but we must not forget that these are but the shadows in the picture of a truly great man.[95] Leibniz, who

"by simple fact." "Everything ends in bare, naked matter of fact; the dependence of things upon God is an empty shadow" (S. 285).

[94] It by no means follows from the logical superfluity of the idea of God in Leibniz's metaphysical system that Leibniz could have subjectively dispensed with it, and the nature of the subject renders it difficult to find conclusive evidence. Nor is it always easy to discriminate between religious needs (which Zeller, S. 103, supposes in Leibniz), and the need of living in peace with the religious sentiments of one's surroundings. At the same time, we do not wish to put Leibniz in this matter on exactly the same level with Descartes. Not only does much in the latter seem to be simply cunning calculation, that in the case of Leibniz leaves the impression rather of the sympathetic compliance of a tender spirit, but we can detect in the latter a certain leaning to Mysticism that is quite wanting in Descartes (Zeller, S. 103). And in this there is not any psychological inconsistency with the clear and rigid Determinism of his system, nor yet an argument for the sincerity of his theological juggleries. The saying of Lichtenberg referred to in the text (in the 'Observations on Man' in the First Part of the 'Vermischte Schriften') is in full: "Leibniz has defended the Christian religion. To conclude at once from this, as the theologians do, that he was a good Christian, shows very little knowledge of the world. The vanity of handling a subject better than its professors is, with a man like Leibniz, who had little solidity, a much more likely impulse to do so than religion. Let us look a little more closely into our own hearts, and we shall learn how little can be affirmed of others. Nay, I even venture to say that sometimes we believe that we believe something, and yet do not believe it. Nothing is more unsearchable than the system of our springs of action."

[95] A good characterisation of Leibniz, with special reference to the influences that determined his theology, is given by Biedermann, Deutschland im 18. Jahrh., II. Band. 5 Abschnitt; comp. especially S. 242 ff. Biedermann is quite right when he regards as inadequate Lessing's well-known defence of Leibniz's position. Lessing talks of esoteric and exoteric doctrines, in a way, however, which seems to us to be itself somewhat esoteric.

introduced Toland to his royal friend the Princess Sophie Charlotte, must have himself known that the shifting and ambiguous foundations of his Theodicy could form but a weak protection against Materialism—to the true thinker none at all. Serena can have as little derived from this work any real satisfaction as she had derived serious anxiety from Bayle's Dictionary and Toland's Letters. For us only the doctrine of monads and the pre-established harmony possess importance. There is more philosophical weight in these two notions than in many a prolix system. But to show their importance we need only explain them.

We have repeatedly seen how difficult, how impossible even, it must ever be for Materialism, so far as it adopts the notions of atoms, to account for the *locality* of sensations, and generally for the facts of consciousness (cf. vol. i. p. 267). Do they consist in the combination of atoms? Then they exist in an abstraction, and are, objectively speaking, nowhere. Are they in the motion? That would be the same thing. We only regard the moved atom itself as the seat of the sensation. How, then, does sensation result in consciousness? Where is this consciousness? In an individual atom, or again in abstractions—or in void space, which then would be no longer void, but filled with a strictly immaterial substance.

To explain the mutual influence of the atoms there is no principle available but that of impact. An infinite succession of such impacts could produce sensation in the atom acted upon. This seems at least as likely as that the vibration of a string or of a part of the atmosphere should produce a sound. But where is the sound? In truth, so far as we become conscious of it, in the hypothetical central atom: that is an illustration does not help us. We are no further than we were before. We lack in the atom the combining principle which transforms a multiplicity of collisions into the unity of sensation. We are ever faced by the same difficulty. We may think of the atom as we will—as composed of dead or mobile particles, of sub-atoms,

as capable of 'inner conditions' or not: to the question where and how the collisions pass from their manifoldness into the unity of feeling, there is not only no answer ready, but so soon as we go to the root of the matter, so far from being obvious, it ceases to be even conceivable. Only when we remove, as it were, the eye of our understanding will it seem natural that such a combination of collisions can result in the production of sensations, just as several points, when we carry back the bodily eye, flow together into one. Is it that the intelligibility of things lies in this, that we make only a moderate use of our understanding, as the Scottish Common-sense philosophers? That would be no *rôle* for a Leibniz! We see him in face of the difficulty: impact, as Epikuros had proposed; or action at a distance, as the successors of Newton; or perhaps no action at all.

That is the *salto mortale* to the pre-established harmony. Whether Leibniz reached his doctrine through other similar views, or at a leap, or as ever, we will not ask. But here is the point that lends its importance to this doctrine and it is this very point which makes it also so important in the history of Materialism. The mutual interaction of the atoms as producing sensations in one or several of them is unthinkable, and therefore we must not adopt it. The atom produces its own sensations from itself: it is a monad developing itself in accordance with its own internal laws of life. The monad has no windows. Nothing goes out of it, nothing comes into it. The outer world is its idea, and this idea arises within it. Every monad is a world to itself: no one is like another. The one is rich in ideas, the other is poor. The ideas, however, of all the monads consist in an eternal system, in a complete harmony, which was ordained before the beginning of time, and which constantly persists through the continuous vicissitudes in all the monads. Every monad represents to itself confusedly or clearly the whole universe, the whole sum of all that happens, and the sum of all

monads is the universe. The monads of inorganic nature have only ideas which completely neutralise themselves as those of a man in dreamless sleep. Higher stand the monads of the organic world: the lower animals consist of dreaming monads; in the higher animals appear sensation and memory; in man we have thought.

Thus we begin from a starting-point based upon reason, and, by means of a vivid imaginative process, find ourselves in the poetry of notions. Whence did Leibniz know, if the monads all produce ideas from themselves, that there are other monads besides his own Ego? Here he has to meet the same difficulty as Berkeley, who reached the same point by the path of Sensationalism which we here attain by means of Atomism. Berkeley also regarded the whole world as idea, a standpoint which Holbach could not refute. Cartesianism had already led certain of its continuators to doubt whether, besides their own being, which produces action and passion, pleasure and pain, strength and weakness, as its own ideas from itself, anything exists in the whole wide world.[96] Many will believe that such a theory can easily be refuted by a douche or a Seidlitz powder with a moderate diet; but nothing will prevent the thinker who has reached this standpoint from holding that powder, doctor, his own body, and, in brief, the whole universe, are but an idea of his own, and that outside this nothing exists. Even if such a one wishes to believe that there are other beings—which will always be admitted as conceivable—we are still far from showing the necessity of pre-established harmony. The ideal worlds of these beings might be in most flagrant contradiction: no one would observe it. And yet the thought which Leibniz made the basis of his philosophy has a rare sublimity, nobleness, and beauty. It may be indeed that the æsthetic, the practical, even in that philosophy whose

[96] Cp. i. sec. 2, vol. i. p. 242, and Note 63, ibid. Hennings, in the Gesch. von. d. Seelen der Menschen u. Thiere, Halle, 1774, p. 145, makes the supporters of this opinion a special class of Idealists, whom he designates as 'Egoists,' in opposition to the 'Pluralists.'

end is knowledge, have a more real importance than we are accustomed to suppose.

The monads, with their pre-established harmony, reveal to us the true nature of things as little as the atoms and the laws of nature. They afford, however, a pure and self-contained conception of the world, like Materialism, and do not contain more inconsistencies than this system. But what especially secured the popularity of the Leibnizian system is the ductile looseness of its notions, and the circumstance that its radical consequences were much better masked than those of Materialism. In this respect nothing is more useful than a thoroughgoing abstraction. The tyro who shudders at the thought that the ancestors of the human race might once have been compared with the apes of to-day, comfortably swallows down the monad theory, which declares the human soul to be essentially like all the beings of the universe, down to the most despised mote, which all mirror the universe in themselves, are all small divinities to themselves, and bear within them the same content of ideas, only in various arrangement and development. We do not immediately observe that the ape monads are also included in the series; that they are as immortal as the human monads, and that they may yet perchance, in the course of development, attain to a beautifully ordered content of ideas. If, on the other hand, the Materialist boldly sets the ape at man's side, compares him to a deaf mute, and proposes to educate and train him like a Christian, then we hear the creature gnash its teeth, we see its wild grimaces and obscene gestures, we feel with infinite repugnance the meanness and repulsiveness of the creature, alike in its form and character; and the most convincing arguments, although each of them has a fatal defect, flow together in abundance in order to demonstrate, so clearly that every one may see it, how absurd, inconceivable, and unreasonable such a theory is.

As in this case abstraction does its work, so it does in

all other points. The theologian can on occasion make an admirable use of the idea of an eternal, sublime, divine harmony in all that takes place. That the laws of nature are pure appearance, are but an inferior kind of knowledge possessed by the empirical understanding, suits him admirably, whilst the consequences of this theory, so soon as they are inconsistent with the circle of his doctrines, may easily be disregarded. They are indeed present only in the germ of the notion, and nothing disturbs a man to whom contradictions of all kinds are as his daily bread, except what is apprehensible by the senses. Thus, then, even the establishing of the immateriality and simplicity of the soul was a splendid field for the philosophic gravediggers, whose special function it is to cover a great idea with the refuse and rubbish of commonplace ideas, and so to render it harmless. That this was an immateriality which for ever dislodged by a bold push the old opposition of spirit and matter more effectually than Materialism could—this troubled nobody. Immateriality, this great, this sublime thought, had been proved by the great Leibniz! How contemptuously could one look down on the folly of those who held the soul to be material, and did such ignoble violence to their consciousness!

It was very much the same with the much-extolled and much-abused Optimism of Leibniz's system. Viewed in the light of reason, and tested by its real presuppositions and consequences, this Optimism is nothing but the application of a mechanical principle to the foundation of the facts of the world. God, in choosing the best of possible worlds, does nothing that would not be quite mechanically produced if we suppose the 'essences' of things to act upon each other. In all this God proceeds like a mathematician in solving a problem,[97] and he must so proceed

[97] Very pertinently says Du Bois-Reymond, Leibnitz'sche Gedanken in der Modernen Naturwissenschaft (Zwei Festreden, Berl. 1871), S. 17:—"As is well known, the theory of the maxima and minima of functions was indebted to him for the greatest progress, through the discovery of the method of tangents. Well, he conceives God in the creation of the

because his perfect intelligence is bound to the principle of sufficient reason. The place occupied in a system of self-moving particles by the 'principle of least resistance' is in the divine creation taken by the principle of the least evil. In the result, it all comes to the same thing as if we were to deduce the development of the universe from the mechanical presuppositions of a Laplace and a Darwin. The world may indeed be utterly bad, and yet it is all the time the best of possible worlds. But all this by no means prevents the popular adaptation of Optimism from speaking of the wisdom and goodness of the Creator, as though there were, in fact, no evil in the world at all which is not introduced by our wickedness and our unreason. God is in the system powerless; but in the popular interpretation of the ideas thus established, his omnipotence appears in the most splendid light.

So it is also with the doctrine of innate ideas. Locke had shaken this doctrine; Leibniz restored it, and the Materialists, with Lamettrie at their head, laugh at Leibniz in consequence. Which is right in this point? Leibniz teaches that all thoughts proceed from the spirit itself, that there is no influence whatever exerted from the outside upon the spirit. It is difficult to find a satisfactory objection to this view. But we see at once that there is a complete contrast between the innate ideas of the Scholastics and the Cartesians. With the latter it amounts to this, that we take certain universal conceptions, to which is also usually added the notion of a most

world like a mathematician who, is solving a minimum problem, or rather, in our modern phraseology, a problem in the calculus of variations—the question being to determine, among an infinite number of possible worlds, that for which the sum of necessary evil is a minimum." That, however, God has to deal in this with *given* factors (the possibilities or the 'essences') has been most clearly pointed out by Baumann (Lehren v. Raum, Zeit und Mathematik, ii. S. 127–129). It is, of course, understood that God's perfect intelligence follows undeviatingly the same rules that our reason recognises as the most correct (Baumann, *l. c.*, 115); that is, the activity of God effects that everything is fulfilled according to the laws of mathematics and mechanics. See above, Note 93.

perfect being, and prefer them to all other ideas as regards the witness of their origin, assigning to them a higher degree of credibility. Well then, as in the case of Leibniz *all* ideas are innate, the distinction between empirical and what is called original knowledge completely disappears. Locke holds that the soul is, to begin with, entirely empty; according to Leibniz it contains the universal. Locke makes all knowledge whatever come from outside; Leibniz has it that none so comes. The result of these extremes, as so often happens, is pretty much the same. Suppose we concede to Leibniz that what we call external experience is, in fact, internal development, then Leibniz must, on the other hand, admit that, besides knowledge drawn from experience, there is no specific knowledge. So that Leibniz has in reality only saved the appearance of innate ideas. His whole system must always be reduced to a single great idea—an idea which cannot be proved, although it is also true that, from the standpoint of Materialism, it cannot be refuted, and which takes its start from an obvious insufficiency of Materialism.

If in Leibniz German profoundness reacted against Materialism, it was German pedantry that did so in those who repeated him. The bad habit of setting up definitions out of which nothing essential results was deeply rooted in the nation. It envelops still, like rank weeds, the whole system of Kant, and only now is the fresher spirit brought by the development of our poetry, of the positive sciences, and of our practical efforts, gradually freeing us by a process not yet completed from the nets of the metaphysical. The most influential of the followers of Leibniz was a wide-awake, free-thinking man, but an extremely mediocre philosopher, Professor Christian Wolff, who invented a new Scholasticism, which contrived to assimilate the old to an astonishing extent. Whilst Leibniz produced all his profound ideas in a scattered way, and as it were, incidentally, everything with Wolff was formula and system. All

keenness disappeared from the thoughts, whilst their expression became ever more precise. Wolff gave to the doctrine of pre-established harmony only a corner in his system, and reduced the theory of monads to the old scholastic principle that the soul is a simple incorporeal substance.

This simplicity of the soul, which was exalted to a metaphysical dogma, plays the most important part in the struggle against Materialism. The whole of the great parallel between monads and atoms, harmony and the law of nature, in which the extremes are so sharply opposed and yet so nearly related to each other, shrivels away into certain axioms of the so-called 'rational psychology'—a scholastic discipline of Wolff's invention. Wolff was quite justified in protesting when his less keenly thinking pupil Bilfinger introduced the term 'Leibniz-Wolffian philosophy.' Bilfinger, a man who is several times quoted with respect by Holbach in the 'Système de la Nature,' certainly understood Leibniz quite differently. He got so far in psychology as to give up the old method of self-observation, and to introduce the method of the natural sciences. In terms, at all events, Wolff endeavoured after the same goal in his empirical psychology which he allowed to exist by the side of the rational system; in reality, of course, this empiricism was very slight, although the tendency at least in these and the natural reaction from the wearying struggles for the existence of the soul brought about the leaning which runs through the whole eighteenth century to gather together as many positive facts as possible as to the life of the soul. Lacking as these inquiries were for the most part in keen criticism and steady method, we must yet recognise an essential feature of method in their founding above all things animal psychology. The old controversy between the supporters of Rorarius and Descartes had never been laid to rest, and now came Leibniz, who, by the doctrine of monads, made at once the distinction between all souls a mere question of degree. Occa-

sion enough for renewed comparison! Men compared, tested, collected anecdotes, and under the influence of the well-meaning and sympathetic tendency which distinguishes the culture of the last century, and especially the rationalistic element, it became more and more common to recognise very nearly related creatures in the higher animals.

This movement in favour of a universal and comparative psychology embracing both man and beast might in itself have come very opportunely for Materialism; but the honourable consistency of the Germans held fast as long as was at all possible to *religious* ideas, and they could not at all accustom themselves to the manner of the English and French, who simply ignored the connection between belief and knowledge. There was no way open but to declare the souls of the animals to be not only immaterial, like those of men, but to be immortal also. Leibniz had pitched the tune for the doctrine of the immortality of animals. He was followed as early as 1713 by the Englishman, Jenkin Thomasius, in an Essay on the Soul of Animals, dedicated to the German Parliament, and Professor Baier wrote a preface to this work, which expresses itself, however, somewhat ambiguously as to this question of immortality.[98] In the year 1742 appeared a whole society of friends of animals, who continued to publish for a number of years collected essays on questions of animal psychology, necessarily all in the Leibnizian sense.[99]

[98] In the first edition, Baier and Thomasius were incorrectly called "medical men of the University of Nürnberg." Jenkin Thomasius is an English physician, who was at that time living in Germany, and had probably become connected with the University of Altdorf. At all events, Professor Baier concludes his preface with the words, "Cujus proinde laborem et studia, Academiae nostrae quam maxime probata, cunctis bonarum literarum fautoribus meliorem in modum commendo." The Baier, however, who wrote this is not the physician Johann Jacob Baier, then living in Nürnberg, but the theologian Johann Wilhelm. A brief extract from the work, which appeared at the University press of Kohlesius in 1713, is in Scheitlin's Thierseelenkunde, Stuttg. u. Tüb., 1840, i. 184 ff.

[99] I have not been able to find fuller details as to this society in my preparations for the first edition, and refer therefore for proofs to Grässe's Bibl. Psychologica, Leipz., 1845,

The most famous of these was the production of Professor G. F. Meier, 'Versuch eines neuen Lehrgebäudes von dem Seelen der Thiere,' which appeared in 1749 at Halle. Meier did not content himself with maintaining that animals have souls, but went so far as to propose the hypothesis that these souls go through various stages, and finally reach the degree of *spirits*, that is, will stand on the same level with man.

The author of this work had already made himself a name, indeed, by his attack upon Materialism. As early as 1743 he published his 'Beweis, dass keine Materie denken könne' (Proof that no matter is capable of thought), which appeared rewritten in 1751. It is far from possessing as much originality as the Animal Psychology. It revolves merely in the circle of the Wolffian definitions. About the same time the Königsberg professor Martin Knutzen made an attempt upon the great question of the day, whether matter can think. Knutzen, who numbered Immanuel Kant among his most zealous pupils, supports himself freely upon Wolff, and supplies not only a metaphysical framework, but also very felicitous examples and historical material testifying to wide reading. And yet here, too, keenness is wanting to the proof itself, and there is no doubt that writings like these, proceeding from the most learned professors against a doctrine decried as quite untenable, as frivolous, paradoxical, and absurd, must have greatly contributed to shake the reputation of metaphysic to its foundations.[100]

where, under the name of Winkler, the titles of the treatises are referred to. One of them (in the year 1743) discusses the question, 'Whether the Souls of Animals die with their Bodies.' In Henning's Gesch. v. d. Seelen der Menschen u. Thiere, Halle, 1774, the title of the collective essays is somewhat more fully given than in Grässe. It runs, "Philosophische Untersuchungen von dem Seyn und Wesen der Seelen der Thiere, von einigen Liebhabern der Weltweisheit in sechs verschiedenen Abhandlungen ausgeführt und mit einer Vorrede von der Einrichtung der Gesellschaft dieser Personen an's Licht gestellt von Johann Heinrich Winkler, der griech. und lateinischen Sprache Professorn zu Leipzig: Leipz. 1745."

[100] Further information as to Knutzen's work may be found in Jürgen Bona Meyer, Kant's Psychologie, Berlin, 1870, S. 225 ff. Meyer proposed

Through these and similar writings, (wholly disregarding Reimann's 'Historia Atheismi' (1725), and similar works of a more general character), the materialistic question was powerfully raised in Germany, when suddenly the 'Homme Machine' fell upon the literary arena like a bomb hurled from an unknown hand. Of course the self-confident school of philosophy did not long neglect to show its superiority to this object of annoyance. While men were still disputing whether the Marquis d'Argens, whether Maupertuis, or some personal enemy of Von Haller's, had written the book, there appeared a flood of criticisms and polemical writings.

Of the German replies we shall here mention but a few. A Magister Frantzen attempted to prove against the 'Homme Machine,' by the usual arguments, the sacredness of the whole Bible, and the credibility of all the narratives of the Old and New Testaments. He might have directed himself to a better address, but he proved this at least, that at that time even an orthodox theologian could attack a Lamettrie without getting into a passion.[101]

More interesting is the production of a famous Breslau physician called Tralles. He, an inordinate admirer of Von Haller, whom he calls the twofold Apollo (in medicine and poetry), must be distinguished from the well-known physicist Tralles, who lived considerably later, but, on the other hand, may be one and the same with the follower of Haller, who is mentioned by Gesenius as the author of an 'incredibly pitiful' didactic poem on the 'Riesengebirge.'

to inquire whence Kant derived his idea of the 'rational psychology.' That serves as a basis for the refutation contained in the 'Kritik.' The result is, that in all probability these words are the most important: "Knutzen's Philos. Abhandl. von der immater. Natur der Seele, darinnen theils überhaupt erwiesen wird, dass die Materie nicht denken könne, und dass die Seele unkörperlich sei, theils die vornehmsten Einwürfe der Materialisten deutlich beantwortet werden, 1774; Reimarus, Vornehmste Wahrheiten der natürl. Religion, 1774; und Mendelssohn's Phädon, 1767." Knutzen deduces the nature of the soul from the unity of self-consciousness; precisely the point against which Kant later directed all the vigour of his criticism.

[101] Frantzen, Widerlegung des 'L'Homme Machine:' Leipz. 1749. The book contains 320 pages.

He wrote a stout book in Latin against the 'Homme Machine,' and dedicated it to Von Haller, probably to console him for Lamettrie's perfidious dedication.[102]

Tralles starts from the point that the 'Homme Machine' wants to persuade the world that all doctors are necessarily Materialists. He struggles to maintain the honour of religion and the innocence of medical science. It is characteristic of the *naïveté* of his standpoint that he draws for the grounds of his refutations upon all the four principal sciences, whose weight of proof he seems to regard as being co-ordinate, if indeed it is not graduated according to the precedence of the faculties. In all the main points the current proofs drawn from the Wolffian philosophy meet us everywhere here also.

All that Lamettrie wants to conclude from the influence of the temperaments, from the effects of sleep, opium-taking, fever, hunger, drunkenness, pregnancy, bloodletting, climate, and so on, is simply disposed of by saying that all these observations only go to show a certain correspondence between body and soul. The propositions as to the teachableness of animals occasion the obvious remark that no one would question the right of the 'Homme Machine' to the sceptre in the new monkey-kingdom that was to be founded. Speaking animals do not belong to the best world, or otherwise we should have had them long ago.[103] But even supposing that the animals could talk, they would certainly not learn geometry. Mere external movement can never become internal sensation. Our thoughts, which are bound up with nerve changes, yet proceed from nothing but the divine will. The 'Homme Machine' ought rather to study Wolff's psychology, in

[102] The title of his work runs, "De machina et Anima humana prorsus a se invicem distinctis, commentatio, libello latere amantis autoris Gallico 'homo machina' inscripto opposita et ad illustrissimum virum Albertum Haller, Phil. et Med. Doct. exarata a D. Balthas. Ludovico Tralles, Medico Vratisl.: Lipsiae et Vratislaviae apud Michael Hubertum, 1749."

[103] It need scarcely be pointed out that Leibniz's theory of the actual world as the best, rightly understood, excludes no kind of development.

order to improve his erroneous ideas of the power of imagination.

More subtly and skilfully, but by no means more thoroughly than Tralles, goes Professor Hollman to work, who attacked the anonymous author anonymously, the satirist satirically, the Frenchman in fluent French, which of course, therefore, brought no result in the deepening of knowledge.[104] The 'Lettre d'un Anonyme' found especial approbation through the humorous fiction that there was really a 'man machine' who could not think otherwise, and was incapable of comprehending anything higher. This assumption gives occasion to a series of witty turns, and spares the letter-writer the trouble of proof. What, however, incensed Lamettrie more than all the jesting was the expression of a conjecture that the 'Homme Machine' was a plagiarism from the 'Confidential Correspondence.'

Towards the end of the anonymous letter a prosaic fanaticism became increasingly apparent. Spinozism especially has to bear the brunt. "The Spinozist is in my eyes a pitiful and deluded creature, whom one must commiserate, and if he is not beyond assistance, attempt to help by two or three not too profound remarks from the 'Theory of Reason,' and a clear explanation of what 'one' is, and 'many,' and what a substance is. He who has clear ideas of these, freed from all prejudices, will be ashamed that the deluded notions of the Spinozists have even for a quarter of an hour disturbed him."

Scarcely a generation later and Lessing had uttered the ἓν καὶ πᾶν, and Jacobi declared war upon reason itself, because he supposed that it must inevitably lead to Spinozism any one who follows it alone.

[104] Hollman, a teacher of wide but ephemeral reputation, was at that time (since 1737) professor in Göttingen. According to Zimmermann, Leben des Herrn von Haller, Hollmann is the writer of the letter ('Lettre d'un Anonyme pour servir de Critique ou de refutation au livre intitulé L'Homme Machine'), which first appeared in German in the Göttingen journals, and was then translated at Berlin. So that the merits of the French style would not belong to Hollmann.

If, in the midst of this storm against the 'Homme Machine,' the connection between general psychology and the reaction against Materialism for some time disappeared from sight, yet later it became once more conspicuous. Reimarus, the well-known author of the Wolfenbüttel Fragments, was a pronounced Deist and a zealous partisan of theology, and therefore a thoroughgoing enemy of Materialism. His 'Considerations on the Art Instincts of Animals,' which, starting from the year 1760, passed through several editions, serve him to demonstrate everywhere the design in creation and the traces of a creator. So that it is in the two leaders of German Rationalism, Wolff, who was threatened by the King of Prussia with the cord for his teaching, and Reimarus, whose 'Fragments' involved their editor, Lessing,* in such violent controversies, that we find the most energetic representatives of the reaction against Materialism. Henning's 'History of the Souls of Men and Animals' (1774), a work of little acuteness but of great erudition, which by its numerous quotations affords an excellent view of the controversies of the time, may be regarded as almost from beginning to end an attempt to refute Materialism.

The son of the Reimarus of the 'Fragments,' who continued his father's inquiries in animal psychology, a skilful doctor and a freethinker, published later, in the 'Göttingische Magazin für Wissenschaften und Literatur,' a series of 'Considerations on the impossibility of corporeal recollections, and of a material imagination,' essays that we may consider as the most solid work produced by the eighteenth century reaction against Materialism. But in the very next year after these essays there appeared in Königsberg a work that must not be looked at from the narrow standpoint of this reaction, and yet whose decisive influence put an end for a time to Materialism together

* [See Mr. Sime's valuable 'Life of Lessing,' the fruit of many years' study and research: 2 vols. 1877.]

with the old metaphysic, to all those who stood on the heights of science.

One circumstance, however, that helped to bring about so thorough a reform of philosophy was, above all, the defeat that Materialism had inflicted upon the old metaphysic. In spite of all refutations upon special points, Materialism lived on, and gained ground, all the more perhaps because it was not a narrow and exclusive system. Men like Forster, like Lichtenberg, leaned strongly to this philosophy, and even religious minds and enthusiastic natures, like Herder and Lavater, borrowed important elements from Materialism. Especially materialistic modes of thought very quietly gained ground in the positive sciences, so that the physician Reimarus could not unfairly begin his 'Considerations' with the remark that recently the operations of thought in many, and indeed in nearly all, writings on the subject had been treated as corporeal. This was written by a keen-sighted opponent of Materialism in 1780, after philosophy had vainly broken so many lances against it. The truth was, that all the Scholastic philosphy of the time could supply no sufficient counterpoise to Materialism. The point on which Leibniz had really outbid Materialism in consistency was not forgotten, indeed, but had lost its force. The impossibility of the transition of an external, multiple movement into an internal unity, into sensation and thought, is indeed upon occasion pointed out by nearly every opponent of Materialism; but the point is lost in a wilderness of other and quite worthless arguments, or stands in abstract nakedness before the rich colours of the Materialistic argument. In treating the positive principle of the simplicity of the soul quite dogmatically, and so exciting the liveliest controversy, the strongest argument was actually made the weakest. The monad theory is justified merely as a development of Atomism, the pre-established harmony only as a necessary transformation of the idea of necessity in nature. When deduced from pure notions,

and so directly opposed to Materialism, these important ideas lose all their force.

On the other hand, Materialism too was utterly incompetent to fill the gap and make itself the dominant system. We should be very far wrong if we saw in this only the influence of university traditions and of the ruling powers in State and Church. This influence could not long have maintained itself against a living and general conviction. Much rather were men thoroughly weary of the everlasting monotony of materialistic dogmatism, and longed for revival through life, through poetry, through the positive sciences.

The whole intellectual impulse of the eighteenth century was unfavourable to Materialism. It was marked by an ideal character that became clear and obvious only after the middle of the century, but that was already contained in the first beginnings of the movement. If, indeed, we start from the end of the century, it may appear as though it was only in the brilliant epoch of Schiller and Goethe that the ideal effort of the nation rose above the barren poverty of the rationalistic era, and above the prosaic pursuit of utility; but if we follow the various confluent tendencies to their sources, we shall find a very different picture. From the end of the seventeenth century, it was observed by thorough, clear-sighted men in Germany how far they were behind other nations. A struggle for freedom, intellectual progress, and national independence began in the most various spheres in various shapes, appearing here and there in isolated efforts, until there resulted a general and profound movement of men's minds. The Rationalists at the beginning of the eighteenth century were for the most part very different from that insipid Berlin society with which Goethe and Schiller were at strife. Mysticism and Rationalism became allies in the battle against the ossified orthodoxy in which men were beginning to recognise the fetters of the spirit and the hindrance of progress. Since Arnold's important 'History

of the Church and of Heretics' (1699), the recognition of the rights of the suppressed persons and parties in history had become a valuable aid to free thought.[105] This ideal starting-point is very characteristic of the German Rationalistic movement. While Hobbes admitted the right of the prince to erect a general superstition into a religion by his sovereign command, while Voltaire wished to retain the belief in God in order that the peasants might pay their rents and obey their superiors, in Germany we are met with the remark that truth dwells with the persecuted, the oppressed, and the calumniated, and that every church in possession of power, of dignity, and endowments is by this very circumstance inclined to persecute and to suppress the truth.

Even the direction of the mind towards utility gained in Germany an ideal character. Here no great industrial movement was developed as in England, no towns sprang up out of the ground, riches did not heap themselves up in the hands of capitalists; poor preachers and teachers asked what could help the people, and set to work to found new schools and introduce new branches into existing schools, to advance the technical education of the honest burghers, and in the country advance agriculture, to promote intellectual activity as well as energy in one's calling, and to enlist labour in the service of virtue. But even the opposite tendency to the beautiful and sublime was prepared long before the beginning of the classic age of literature, and here too it was the schools that in their sphere fostered and developed the beginnings of this upward movement. The very time at which the dominance of Latin in the universities was broken down brought about the revival of classical education. This stood in that melancholy period, during which Latin was learned for the sake of theology, and theology for the sake of Latin,[106] in

[105] Comp. Biedermann, Deutschland im 18. Jahrh., Leipz. 1858, ii. 392 ff.

[106] Comp. Justi, Winkelmann, i. 25. At p. 23 ff. are interesting details on the condition of the schools towards

a surprisingly degraded state through nearly all Germany. The classical were replaced by modern Latin authors on Christian subjects. Greek was not studied at all, or confined to the New Testament and a collection of moral aphorisms; the poets, who were deservedly put in the front rank by the great humanists, and who in England, to the great benefit of the national culture, had gained a safe position of esteem, had in Germany almost utterly disappeared from the school programmes. Even in the universities there was little humanistic culture to be found, and Greek literature was completely neglected. From this time until the brilliant period of German philology, from Friedrich August Wolf, progress was made, not by a sudden spring, nor by a revelation from without, but by a painful struggle from step to step, and in the train of that great movement that may be described as the second renascence in Germany. Gervinus jests at "the antiquarian scholars, the collectors of materials, the most prosaic of men," who towards the end of the seventeenth and beginning of the eighteenth century everywhere began "in their leisure hours to write poetry instead of going out

the close of the seventeenth century. We will only add that Winkelmann's teacher, Tappert, though he knew little Greek, yet obviously belonged to the reformers who, on the one hand, provided for the needs of life by introducing new branches of study, and put an end to the exclusive use of Latin; while, on the other, they sought even in Latin to assert the humanistic tendency in opposition to the old pedantry of the seventeenth century. It is not mere chance that men fell back on many points in gymnasial government in the beginning of the eighteenth century, upon the traditions of Sturm, and therefore, *e.g.*, the zeal in the imitation of Cicero at this period must not be regarded as mere traditional veneration of Latin, but as a newly awakening sense of elegance and beauty in language

As more important illustrations of scholastic reform in this sense we will mention only the activity of the Nuremberg inspector Feuerlein (comp. Von Raumer, Gesch. d. Päd., 3te Aufl., ii. 101, &c., where indeed too little stress is laid on Feuerlein's efforts to improve the quality of Latin and Greek teaching, besides his efforts in favour of German and positive science. The well-known polyhistor Morhof exercised much influence on Feuerlein), and the learned rector Köhler at Ansbach, from whose school came J. M. Gesner, who established the reforms here mentioned by his 'Institutiones Rei Scholasticae' (1715), and his 'Greek Chrestomathy' (1731). Comp. Sauppe, Weimarische Schulreden, viii., Joh. M. Gesner (Weimar, 1856.)

to walk;" but he overlooks that these same learned authors of mediocre verses were quietly introducing another spirit into the schools. What they lacked in inspiration must be supplied by zeal and purpose, until a generation arose developed under the passionate stimulus of youth. In almost all the notable poets of the pre-classical period, like Uz, Gleim, Hagedorn, and so on, we may detect the influence of the school.[107] Here they were making German verses, there reading Greek authors; but the spirit in which both were done was the same; and the most influential reviver of classical education in the Gymnasia, Johann Mathias Gesner, was at the same time a friend of practical studies and a zealous promoter of the study of German. Not in vain had Leibniz and Thomasius shown the advantages that other nations were deriving from the study of their mother tongue.[108] What Thomasius had been obliged to assert by violent struggles, the use of German in academical lectures and in the handling of the sciences, became gradually triumphant in the eighteenth century, and even the conservative Wolff by his use of German in philosophical writings helped to develop the growing enthusiasm for national life.

Strangely enough, it was men without any poetic gifts who had to prepare the way for the outburst of poetry—scholars of pedantic character and corrupt taste who must lead the way to the models of noble simplicity and free humanity.[109] The forgotten news of the splendour of the

[107] Uz, whom his contemporaries later admired as the German Horace, was educated at the Gymnasium in Ansbach, from which J. M. Gesner came (see the previous note). Gleim came from Wernigerode, where indeed they were still backward as to Greek, but wrote Latin and German verses all the more zealously (comp. Pröhle, Gleim auf der Schule, Progr., Berlin, 1857). In Halle, where these young men formed the Anakreontic Society, they began by reading Anakreon in the original. The two Hagedorns, poet and art connoisseur, came from Hamburg, where the famous polyhistor Joh. Alb. Fabricius wrote good books, and at the same time "bad versicles" (Gervinus).

[108] On Thomasius and his influence comp: especially Biedermann, Deutschl. im 18. Jahrh., ii. 358 ff.

[109] A specially characteristic instance of this is afforded by Professor Damm in Berlin (admirably portrayed by Justi, Winkelmann, i. 34 ff.), whose influence was very important in the spread of Greek, and especially of Homer.

old classical literature led men's minds towards an ideal of beauty, of which neither the seekers nor the guides had a clear idea, until daylight came with the achievements of Winckelmann and Lessing. The idea by education and science to come nearer to the Greeks appears here and there as early as the eighteenth century, and gains strength with every decade, until at length, by the profound inquiries of Schiller, the spheres of the ancient and the modern were rationally separated, while the supremacy of Greek art, within certain limits, was the more firmly established.

Search for the ideal runs through the whole century. Although they could not yet think of competing with the most advanced nations in power and wealth, in political dignity, and in the magnitude of material undertakings, at least they tried to surpass them in the highest and noblest of efforts. In this sense Klopstock announced the rivalry of the German with the British muse, when there was as yet little to be said for the pretensions of the former; and Lessing burst asunder with his powerful criticism the fetters of all false authorities and defective models, in order to smooth the way to the highest achievements, without troubling himself as to who would walk in it.

In this sense, moreover, foreign influences were not passively adopted, but were transformed. We have seen how English Materialism early took root in Germany, but could not gain the upper hand. Instead of Hobbes's hypocritical theology, men demanded a real God, and an idea on which to base the universe. Nor could the leaders of German Rationalism content themselves with the way in which Newton and Boyle, by the side of a great and magnificent order of the universe, kept the patchwork of miracles. With the Deists they were more in harmony; but above all Shaftesbury gained a great influence, who unites with the abstract clearness of his system a poetical force of imagination and a love for the ideal, by which mere reason is balanced, so that, without any criticism, the

services of the Kantian philosophy in securing peace between the heart and the understanding were anticipated. So that it was for the most part in Shaftesbury's sense that the doctrine of the perfection of the world was understood, even when one ostensibly rested on Leibniz. The text is taken from Leibniz, the interpretation from Shaftesbury; and instead of the mechanism of the uncreated essences, appeared, as in Schiller's youthful philosophy, the hymn to the beauty of the universe, in which evil contributes to the harmony of the whole, like shadows in painting, like discords in music.

With this circle of thoughts and feelings, Spinozism is much more consonant than Materialism; nay, perhaps nothing could more clearly show the difference between the two tendencies than the influence which Spinoza exercised upon the leading minds of the eighteenth century. In this we must not, of course, forget that no single one of these men was a Spinozist in the strict sense of the word. They kept to a few main ideas: to the unity of all that exists, the regularity of all that happens, the identity of spirit and nature. They cared very little for the form of the system and the connection of the individual principles; and if it is asserted that Spinozism is the necessary result of natural thought, this involves no admission of the correctness of its proofs in their mathematical form, but the totality of this philosophy, as opposed to the traditional Christian and Scholastic philosophy, is recognised as the aim of all speculation. Thus the acute Lichtenberg said: "If the world continues to exist for countless numbers of years, the universal religion will be a purified Spinozism. Reason left to itself leads to nothing else, and it is impossible that it should." [110] Here Spinozism, the purification of which doubtless involves the rejection of the mathematical formulæ that contain so many fallacies, is estimated, not as a final system of theoretical philosophy, but as a religion; and in this Lichtenberg, who,

[110] Lichtenberg's Vermischte Schriften herausgegeben von Kries, ii. 27.

with all his leaning to theoretical Materialism, had a strong religious element, was entirely in earnest. No one would find the religion of the future in the theoretically more logical, and in details the more correct, system of Hobbes. In the 'Deus sive Natura' of Spinoza the God is not lost behind matter. He is present and lives, as the inner side of the same great whole that to our senses appears as nature.

Goethe also protested against our conceiving the God of Spinoza as an abstract idea—that is, as a cipher—while he is rather the most real and active unit, that says to itself: "I am that I am, and in all the forms in which I may appear shall be what I shall be."[111] Decidedly as Goethe turned away from the Newtonian God, who "from outside only impels" the world, he as decidedly held fast to the divinity of the one inward essence, which appears to its own phenomena, to men, only as the world, while in its true nature it is exalted above any conception of one of its creatures. Still in his later years Goethe took refuge in the Ethics of Spinoza if any unsympathetic theory had affected him unpleasantly, and he calls it his pure, deep, innate, and habitual mode of thinking, which "had taught him inevitably to see God in nature, nature in God."[112]

As everybody knows, Goethe has also let us know the impression made by the 'System of Nature' upon the youthful poet. The judgment which he formed of it, although very far from doing justice to Holbach, so strikingly exhibits the antithesis between two utterly opposite intellectual movements, that we may in fact let Goethe speak here as representative of the aspiring German youth of that period: "We could not understand how such a book could be dangerous. It appeared to us so dark, so Cim-

[111] Comp. Goethe's letter, published by Anton Dohrn (in Westermann's Monatshefte), reprinted in Bergmann's Philosophische Monatshefte, iv. S. 516 (Mar. 1870).

[112] In the Annalen, 1811, on occasion of Jacobi's book, 'Von den göttlichen Dingen.'

merian, so death-like, that we could scarcely find patience to endure its presence."[113]

The further remarks which Goethe there makes in the spirit of his youthful modes of thought are not of any great importance, except in so far as they also show that the book appeared to him and his young companions "as the very quintessence of senility, as unsavoury, nay, absurd." They demanded a full, entire life, such as a theoretical and polemical work neither could nor ought to give: they were unwilling to dispense, even in a work of Rationalism, with that satisfaction of the spirit which is really to be found only in the sphere of imagination. They did not reflect that, even if the universe were also the supreme work of art, yet an analysis of its elements would always have to be something else than the enjoyment of the whole in the contemplation of its magnificence. What becomes of the beauty of the 'Iliad' if it is resolved into its letters and spelt? and the very task undertaken by Holbach was to break up the most necessary knowledge into its letters, according to his notions. No wonder that Goethe concludes his judgment with the following remark: "How hollow and empty did we feel in this melancholy, atheistical half-night, in which earth vanished with all its creatures, heaven with all its stars! There was to be a matter in motion from all eternity, and by this motion, right and left, and in every direction, without anything further, it was to produce the infinite phenomena of existence. Even all this we should have allowed to pass, if the author, out of his moved matter, had really built up the world before our eyes. But he seemed to know as little about nature as we did; for having set up some general ideas, he quits them at once for the sake of changing that which appears as higher than nature, or as a higher nature within nature, into material heavy nature, which is moved, indeed, but without direction or form—and thus he fancies he has gained a great deal."

[113] Wahrheit und Dichtung, Buch xi.

These youths, moreover, could of course make no use of the proofs of the Scholastic philosophy 'that no matter can think.' Goethe says: "If, after all, this book did us any mischief, it was this, that we took a hearty dislike to all philosophy, and especially metaphysics, and remained in that dislike; while, on the other hand, we threw ourselves into living knowledge—experience, action, and poetising—with all the more liveliness and passion."

Second Book.

HISTORY OF MATERIALISM SINCE KANT.

FIRST SECTION.

MODERN PHILOSOPHY.

CHAPTER I.

KANT AND MATERIALISM.

THE pre-eminent position which we have assigned to Kant by the very division of our work stands already in much less need of justification, or even of explanation, than when the first edition appeared, almost eight years ago. It is true, indeed, that the retreat of our philosophical Romanticism in Germany had been settled long before. As a routed army looks around it for a firm point where it may hope to collect again into order, so there was heard everywhere in philosophic circles the cry, 'Retreat upon Kant!' Only more recently, however, has this retreat upon Kant become a reality, and it is found that at bottom the standpoint of the great Königsberg philosopher could never have been properly described as obsolete; nay, that we have every reason to plunge into the depths of the Kantian system with the most serious efforts, such as have hitherto been spent upon scarcely any other philosopher than Aristotle.

Misapprehensions and impetuous productiveness have combined in an intellectually active age to break through the strict barriers which Kant had imposed upon speculation. The reaction which succeeded the metaphysical

intoxication contributed the more to the return to the prematurely abandoned position, as men found themselves again confronted by the Materialism which at the appearance of Kant had disappeared, and left scarcely a wrack behind. At present we have not only a young school of Kantians in the narrower and wider sense,[1] but those also who wish to try other paths see themselves compelled first to reckon with Kant, and to offer a special justification for departing from his ways. Even the factitious and exaggerated enthusiasm for Schopenhauer's philosophy partly owed its origin to a related tendency, while in many cases it formed for more logical minds a transition to Kant. But a special emphasis must here be laid on the friendly attitude of men of science, who, so far as Materialism failed to satisfy them, have inclined for the

[1] Otto Liebmann here specially deserves mention, who, in his work 'Kant und die Epigonen' (1865), expressed it as his conviction: "Es muss auf Kant zurückgegangen werden" (S. 215). Jürgen Bona Meyer, who as early as 1856 contributed to the then raging 'Controversy on Body and Soul,' one of the best elucidations from the Kantian standpoint, has in 'Kant's Psychologie' (1870) similarly expressed himself as to Kant's importance for present philosophy (Einl., S. 1–3). But of the utmost importance is especially 'Kant's Theorie der Erfahrung von Dr. Hermann Cohen,' Berlin, 1871, because here for the first time the whole energy of a special effort was employed to master thoroughly the terminology of Kant, and so, under the guidance of the most accurate fixing of his ideas, to penetrate deeper into the philosopher's meaning; the indispensable necessity of which had just been made clear to everybody by the singular controversy between Trendelenburg and Kuno Fischer. That the thoroughness with which Dr. Cohen went to work has not been without result will perhaps be evident from our present account of Kant's philosophy in its relation to Materialism. The changes made since the first edition are due to a renewed examination of the whole Kantian system, occasioned chiefly by Dr. Cohen's book. A very careful treatise, resting upon an accurate and independent investigation, is the essay contained in the 'Altpreuss. Monatsschrift,' Bd. vii. (reprinted, Königsb. 1870), of Dr. Emil Arnoldt, 'Kant's transscendentale Idealität des Raumes und der Zeit: Für Kant, gegen Trendelenburg.' A thorough understanding of the main point in the Kantian philosophy is shown also by Carl Twesten in his book published in 1863: 'Schiller in seinem Verhältniss zur Wissenschaft.' This work is of later origin than the recently published posthumous historico-philosophical work of Twesten, in which he declares himself a Positivist. If we compare what Twesten says at p. 2 of the essay on Schiller, we are forced to the conclusion that Kant had displaced Comte in Twesten's case.

most part to a way of thinking which, in very essential points, agrees with that of Kant.

And it is, in fact, by no means strictly orthodox Kantianism upon which we must have laid distinctive stress; least of all that dogmatic turn with which Schleiden thought he could crush Materialism when he compared Kant, Fries, and Apelt with Keppler, Newton, and Laplace, and maintained that by their labours the ideas 'Soul, Freedom, God,' were as firmly established as the laws of the stellar world.[2] Such dogmatism is entirely foreign to the spirit of the 'Critick of Reason,' although Kant personally attached great value to his having withdrawn these very ideas from the controversy of the schools, by relegating them, as utterly incapable as well of positive as negative proof, to the sphere of practical philosophy. But the whole of the practical philosophy is the variable and perishable part of Kant's philosophy, powerful as were its effects upon his contemporaries. Only its site is imperishable, not the edifice that the master has erected on this site. Even the demonstration of this site, as of a free ground for the building of ethical systems, can scarcely be numbered among the permanent elements of the system, and therefore, if we are speaking of the salvation of moral ideas, nothing is more unsuitable than to compare Kant with Keppler, to say nothing of Newton and Laplace. Much rather must we seek for the whole importance of the great reform which Kant inaugurated in his criticism of the *theoretical* reason; here lies, in fact, even for ethic, the lasting importance of the critical philosophy, which not only aided the development of a particular system of ethical ideas, but, if properly carried on, is capable of affording similar aid to the changing requirements of various epochs of culture.

Kant himself was very far from comparing himself with

[2] Comp. Dr. M.J. Schleiden, 'Ueber den Materialismus der neueren deutschen Naturwissenschaft, sein Wesen und seine Geschichte,' Leipzig, 1863. A sharp but not unfair review of this work appeared anonymously under the title, 'M. J. Schleiden über den Materialismus,' Dorpat, 1864.

Keppler; but he made another comparison, that is more significant and appropriate. He compared his achievement to that of Copernicus. But this achievement consisted in this, that he reversed the previous standpoint of metaphysic. Copernicus dared, "by a paradoxical but yet true method," to seek the observed motions, not in the heavenly bodies, but in their observers. Not less "paradoxical" must it appear to the sluggish mind of man when Kant lightly and certainly overturns our collective experience, with all the historical and exact sciences, by the simple assumption that our notions do not regulate themselves according to things, but things according to our notions.[3] It follows immediately from this that the objects of experience altogether are only *our* objects; that the whole objective world is, in a word, not absolute objectivity, but only objectivity for man and any similarly organised beings, while behind the phenomenal world, the absolute nature of things, the 'thing-in-itself,' is veiled in impenetrable darkness.

For a moment we will deal with this idea. How Kant carried it out does not for the moment concern us; but we must all the more closely consider the question how the position of Materialism is affected by this new standpoint.

The end of the First Book showed us the German school philosophy entangled in a serious controversy with Materialism. The favourite image of the hydra, from which two new heads always spring forth when the demigod has struck off one, is anything but suitable to the drama which is unfolded to the unprejudiced spectator of these struggles. Materialism does indeed receive each time a

[3] Comp. the preface to the second edition of the 'Kritik.' Kant indeed lets it here appear (note to p. xxii., Hartenst., iii. 20 ff.) that in thoroughgoing criticism he claims the rôle of a Newton, by whose theory had been *proved* what Copernicus in his opinion (comp. as to this vol. i. p. 230) had only proposed as "hypothesis." But for the purpose of gaining a first view of the nature of the Kantian reform, the comparison with Copernicus made in the preface is more important.

blow that it cannot parry; it is ever the same carte that always strikes home, however clumsily it may often be dealt. *Consciousness* cannot be explained out of material movements. However conclusively it is shown that it is entirely dependent upon material changes, the relation of *external movement* to *sensation* remains inconceivable, and the more light is thrown upon it only a more glaring contradiction is revealed. But next we observe that all the systems that are brought to oppose Materialism, whether they are called after Descartes, Spinoza, Leibniz, Wolff, or after our old friend Aristotle, contain precisely the same contradiction, besides, it may be, a dozen worse ones. When we come to reckon with Materialism, everything comes to light. We here leave entirely out of view what advantages the other systems may perhaps possess in their profoundness, in their relations with art, religion, and poetry, in brilliant divinations and stimulating play of mind. In such treasures Materialism is poor; but it is just as poor in those gross fallacies or hair-splitting sophisms which help the other systems to their so-called truths. In the contest with Materialism, where what is wanted is proof or refutation, all the advantages of profoundness can give no help, and the hidden contradictions are brought to light.

We have, however, made the acquaintance in many forms of a principle against which Materialism has no weapons, and which, in fact, leads us on beyond this way of thinking to a higher view of things. At the very outset of our task we were met by this principle when we saw Protagoras pass beyond Demokritos. And again, in the last era which we treated, we find two men differing in nationality, modes of thought, calling, faith, and character, who nevertheless both abandoned the foundation of Materialism upon the same point—Berkeley the bishop, and D'Alembert the mathematician. The former looked upon the whole world of phenomena as one great delusion of the senses; the latter doubted whether there exists outside

us anything corresponding to what we suppose we see. We have seen how angry Holbach grows over Berkeley without being able to refute him.

There is one province of exact physical inquiry that prevents contemporary Materialists from perversely turning away from the doubt as to the reality of the phenomenal world, that is the physiology of the sense-organs. The astonishing progress made in this field, of which we must later speak again, seems expressly calculated to confirm the Pythagorean proposition that man is the measure of things. When it has once been demonstrated that the quality of our sense-perceptions is entirely conditioned by the constitution of our organs, we can no longer dismiss with the predicate "Irrefutable but absurd" even the hypothesis that the whole system also, into which we bring our sense-perceptions—in a word, our whole experience—is conditioned by an intellectual organisation which compels us to feel as we do feel, to think as we do think, while to another organisation the very same objects may appear quite different, and the thing in itself cannot be pictured by any finite being.

In fact, the idea that the phenomenal world is only the distorted copy of another world of real objects runs through the whole history of human thought. Among the thinkers of ancient India, as well as among the Greeks, is found in many forms the same fundamental idea, which, in the shape given to it by Kant, is now suddenly compared to the achievement of Copernicus. Plato believed in a world of ideas, the eternal and perfect types of earthly phenomena. Kant calls him the foremost philosopher of the intellectual, and Epikuros, on the other hand, the foremost philosopher of the sensible. How much, however, Kant's relation to Materialism differs from that of Plato is clear from the fact that Kant devotes a special eulogy to Epikuros, because in his conclusions he has never transcended the limits of experience, while, *e.g.*, Locke, "after having derived all the conceptions and principles of the mind

from experience, goes so far in the employment of these conceptions and principles as to maintain that we can prove the existence of God and the immortality of the soul —both of them objects lying beyond the limits of possible experience—with the same force of demonstration as any mathematical proposition."[4]

On the other hand, Kant differed no less decidedly from those philosophers who content themselves with proving that the phenomenal world is a product of our ideas. Protagoras made himself at home in this phenomenal world. He completely gave up the idea of an absolute truth, and based his whole system on the proposition that that is true for the man which seems to him true, and that good which seems to him good. The object of Berkeley, in his contest against the phenomenal world, was to get fresh air for distressed faith, and his philosophy stops where his real aim appears. The sceptics entirely content themselves with shattering all fancied truth, and doubt not only the world of ideas and the phenomenal world, but, in fact, the unconditional validity of the laws of thought. And yet it was a sceptic who, by a violent shock, threw our Kant out of the paths of German Scholasticism, and brought him into that direction in which, after thinking and labouring for years, he reached the goal announced in his immortal 'Critick of Pure Reason.' If we wish to get a clear grasp of Kant's fundamental idea, without analysing the whole structure of his system, our way leads through David Hume.

Hume is fully entitled to rank with the series of English thinkers denoted by the names of Bacon, Hobbes, and Locke; nay, it is a question whether the first place among them all is not due to him. Sprung from a noble Scotch family, he was born at Edinburgh in 1711. As early as 1738 appeared his work upon 'Human Nature,' written during a visit to France in complete and studious leisure.

[4] Comp. Krit. d. r. Vern., transcend. Methodenl., 4 Hptst.; Hart. iii. 561; E. T. Meiklejohn, p. 516.

Only fourteen years later did he devote himself to those historical studies to which he owes a great part of his fame. After various occupations, he became at length Secretary of Embassy in Paris; finally, Under Secretary of State. To us Germans, who, by a philosopher, through involuntary association of ideas, understand a professor standing with raised finger before his chair, it must necessarily appear striking that among the English philosophers there have been so many statesmen; nay, what is almost more remarkable, that in England the statesmen are sometimes philosophers.

Hume, in his way of thinking, stands as close to Materialism as a so decided sceptic ever can. He stands on the ground prepared by Hobbes and Locke. He sometimes explained the origin of error, without, however, attaching much value to the hypothesis, by means of a faulty conduction in the brain, in which he imagines all notions to be localised. For that weak point of Materialism which the Materialists themselves know not how to protect, Hume has found a sufficient defence. In admitting that the transition from movement in space to perception and thought is inexplicable, he points out that this inexplicableness is by no means peculiar to this problem. He shows that exactly the same contradiction attaches to all relations of cause and effect. "Place one body of a pound weight on one end of a lever, and another body of the same weight on another end, you will never find in these bodies any principle of motion dependent on their distances from the centre, more than of thought and perception." [5]

Our modern mechanical science would perhaps object to this; but let us remember that all the progress of science has not solved, but only pushed further back, the difficulty to which Hume refers. If we consider two ultimate molecules of matter, or two heavenly bodies, when the motion of the one influences that of the other,

[5] The philosophical works of Hume, Edinb., 1826, i. 315.

we shall be able to account admirably for all the rest, but the relation of the attractive power which brings about the connection to the bodies themselves is concealed under the incomprehensibleness of every single change in nature. It is true that we have not in this way explained the passage of movement in space into thought, but we have shown that this inexplicableness can form no argument against the dependence of thought upon motion in space. The price paid by Materialism for this defence is, indeed, not less than that which the Devil in the legend demands for his aid. The whole cause of Materialism is for ever lost by the admission of the inexplicableness of all natural occurrences. If Materialism quietly acquiesces in this inexplicableness, it ceases to be a philosophical principle; it may, however, continue to exist as maxim of scientific research. This is, in fact, the position of most of our modern 'Materialists.' They are essentially sceptics; they no longer believe that matter, as it appears to our senses, contains the last solution of all the riddles of nature; but they proceed in principle as if it were so, and wait until from the positive sciences themselves the necessity arises to adopt other views.

Still more striking, perhaps, is Hume's kinship with Materialism in his keen polemic against the doctrine of personal identity, of the unity of consciousness, and the simplicity and immateriality of the soul.

"There are some philosophers who imagine we are every moment intimately conscious of what we call our *self* (in German philosophy, 'das Ich'); that we feel its existence and its continuance in existence, and are certain, beyond the evidence of a demonstration, both of its perfect identity and simplicity. . . .

"Unluckily all these positive assertions are contrary to that very experience which is pleaded for them; nor have we any idea of *self*, after the manner it is here explained. . . . For my part, when I enter most intimately into what I call *myself*, I always stumble on some particular percep-

tion or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch *myself* at any time without a perception, and never can observe anything but the perception. When my perceptions are removed for any time, as by sound sleep, so long am I insensible of *myself*, and may truly be said not to exist." If any one has a different notion of *himself*, Hume cannot reason with him. "He may, perhaps, perceive something simple and continued, which he calls *himself*, though I am certain there is no such principle in me. But setting aside some metaphysicians of this kind, I may venture to affirm of the rest of mankind that they are nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity." [6]

The delicate irony which is here directed against the metaphysicians elsewhere hits the theologians. That Hume's views are quite inconsistent with the immortality of the soul in the theological sense need not be said. Nevertheless, he sometimes amuses himself by the malicious observation that all the arguments for the immortality of the soul would have just as much force on his view as on the ordinary assumption of the simplicity and identity of the soul.

That this was the man who produced so profound an impression upon Kant, whom Kant never names but with the utmost respect, must at once place Kant's relation to Materialism in a light other than that in which we are usually willing to regard it. Decided as Kant is in his opposition to Materialism, still this great mind cannot possibly be numbered with those who base their capacity for philosophy upon a measureless contempt for Materialism.

"Physical science will never discover to us the internal constitution of things, which is not phenomenon, yet can serve as the ultimate ground of explanation of phenomena; but it does not require this for its physical expla-

[6] *Loc. cit.*, p. 319, ff.

nations. Nay, even if such grounds should be offered from other sources (for instance, the influence of immaterial entities), they must be rejected, and not used in the course of its explanations; for these explanations must only be grounded upon that which, as an object of sense, can belong to experience, and be brought into connection with our real perceptions, according to the laws of experience."[7]

Kant, in a word, fully recognises two ways of thinking —Materialism and Scepticism—as legitimate steps towards his critical philosophy; both he regards as errors, but errors that were necessary to the development of knowledge. He admits that the former, by reason of its intelligibleness, may become dangerous for the mass of people, while the latter, by reason of its difficulty, will remain confined to the schools; but as to a purely scientific judgment, both he regards as equally respectable, while, however, the preference belongs to Scepticism. There is no philosophical system to which Kant did not occupy a more negative attitude than to these two. The ordinary Idealism, in particular, stands in the sharpest opposition to Kant's 'transcendental' Idealism. In so far as it attempts to prove that the phenomenal world does not show things to us as they are in themselves, Kant agrees with it. As soon, however, as the Idealist will teach us something as to the world of pure things, or even set this knowledge in the position of the empirical sciences, he cannot have a more irreconcilable opponent than Kant.

A hasty reviewer had found "higher Idealism" in Kant's 'Critick.' This appeared to Kant much as if he had been charged with "higher absurdity," so entirely was he misunderstood. We must admire the moderation, and at the same time the keenness, of the great thinker when he replies by setting down two propositions, whch even to

[7] Prolegomena zu jeder künftigen Metaphysik, Riga, 1783, S. 167, Hart. iv. 101. [I have followed Mr. Mahaffy in his translation of the Prolegomena, Kant's Crit. Phil. for Eng. Readers, iii. 154, with one or two changes. The accidental omission of the word 'not' in Mr. Mahaffy's version makes nonsense of the passage.—Tr.]

the blindest must throw a gleam of light into the essence of the Critical Philosophy. "The proposition of all genuine Idealists, from the Eleatic school to Bishop Berkeley, is contained in this formula: 'All cognition by sense and experience is nothing but mere appearance, and truth is in the ideas of the pure understanding and of pure reason only.' The principle which throughout governs and determines my Idealism is, 'All cognition of things from pure understanding, or pure reason only, is nothing but appearance, and truth is in experience only.'"[8]

The purest empiricist cannot express himself more plainly; but how do we reconcile with this so unequivocal proposition the singular phrase that things range themselves according to our ideas?

There can obviously be here no question of the actually formed ideas of a speculating individual. In a certain sense, indeed, to the incarnate Hegelian or Aristotelian things range themselves according to his ideas. He lives in the world of his mental cobwebs, and contrives to make everything harmonise with them. Before a thing can have really become a thing to *him*, it must have modelled itself upon his ideas. But all things are not so yielding, and experience plays such philosophers the awkwardest tricks. Remember Cremonini, who took care not to look through a telescope for fear of stumbling on the rebellious satellites of Jupiter! Kant, who finds all truth in experience, cannot thus have understood the correspondence of things with our ideas. The influence of 'our ideas,' according to Kant's understanding of the matter, must rather be such that it expresses itself in the most general and invariable features of experience in things that are absolutely free from the caprice of the individual. The riddle will then be solved by an analysis of experience, in which we have to demonstrate an intellectual factor due not to things but to ourselves.

All judgments are, according to Kant, either analytical

[8] Prolegomena, &c., S. 204, Hart. iv. 121.

or synthetical. Analytical judgments assert in the predicate nothing but what was already involved in the notion of the subject. If I say, All bodies are extended in this proposition, I have not increased my knowledge of bodies; for I cannot posit the notion of bodies at all without already including the notion of extension. The judgment only resolves the subject into its constituents in order to emphasise one of them by means of the predicate, and so to bring it more fully into consciousness. Synthetic judgments, on the contrary, increase our knowledge of the subject. If I say, All heavenly bodies gravitate, I suppose a quality to be connected with all heavenly bodies which is not already involved in the mere idea of heavenly bodies.

We see, then, that it is the synthetic judgments by which only our knowledge is really extended, while the analytic serve as a means to make things clear and to refute errors; for a judgment that says nothing in the predicate but what was already involved in the subject can, at the most, only remind me of knowledge that I already possessed, or bring out particularly points that otherwise I should overlook; but it can teach me nothing really new. And yet there exists an entire science, perhaps the most important of all, in which we may doubt whether its judgments are synthetic or analytic: it is mathematics.

Before we discuss this important question, we must first briefly refer to what is a judgment *a priori* and a judgment *a posteriori*. The latter draws its validity from experience, the former not. An *a priori* judgment may indeed be based indirectly upon experience,—not, however, as a judgment, but only in so far as its elements are concepts drawn from experience. Thus, for example, the whole sum of true analytic propositions are also *a priori* valid; since, in order to develop the predicate from the idea of the subject, I do not need the help of experience. The subject itself, however, may even in this case indicate an object that I have only become acquainted with through

experience. Thus, for example, the idea of ice is an idea of experience. The proposition, Ice is a solid body, is however, analytical, because the predicate was already contained in the idea I formed of the subject.

Synthetic judgments are with Kant the field of investigation. Are they all *a posteriori*, that is, deduced from experience, or are there also some that are not indebted to experience for their validity? Are there any synthetic judgments *a priori?* Metaphysic pretends to extend our knowledge without needing the aid of experience. But is this possible? Can there be any metaphysic at all? How are, quite generally speaking, synthetic propositions *a priori* possible?

Let us wait an instant. Answers such as, 'By revelation;' 'By inspiration of genius;' 'By the soul's recollection of a world of ideas in which it had once its home;' 'By the development of innate ideas, which unconsciously slumber in man from his birth;'—such answers need no refutation merely because metaphysic, as a matter of fact, has till now fumbled about in bewilderment. If it could be shown that from the bases of such doctrines a real science proceeds, which develops itself with sure footing, instead of having ever to begin again, we might perhaps content ourselves with the lack of a further foundation, just as in mathematics we have been content to abide by the indemonstrableness of the axioms; but all further extension of metaphysic is vain as long as it is not certain whether its structure can have a foundation at all.

Sceptics and Empiricists will make common cause, and will dispose of the question with a simple No! If they succeed in proving this, they may in intimate alliance for ever dominate the field of philosophy. With dogmatic Materialism, too, all would be over, since it builds its theories upon the axiom of the intelligibility of the world, and overlooks that this axiom is at bottom only the principle of order in phenomena; but Materialism may resign its claims to have demonstrated the ultimate causes of all

phenomena. It will then, indeed, resign too its original character, but in alliance with Scepticism and formal Empiricism it threatens all the more to swallow up all other philosophic efforts. To meet them Kant brings forward a formidable ally—Mathematics.

Hume, who doubted every judgment that went beyond experience, was not quite clear whether, for example, two straight lines meeting in an exceedingly small angle might not have a segment of a certain extent in common, instead of cutting each other in one point only as mathematics require. Still Hume conceded the pre-eminent conclusiveness of mathematics, and thought he could trace it to this, that all mathematical judgments rest only upon the principle of contradiction — in other words, that they are entirely analytical. Kant maintains, on the contrary, that all mathematical judgments are synthetical, and therefore, of course, synthetical judgments *a priori*, since mathematical propositions need no confirmation by experience.

Unless we are to misunderstand Kant completely, we must here strictly distinguish between intuition and experience. An intuition, that, for instance, of a series of triangles with continually obtuser angles at the apex, and continually broader base, is indeed also an experience; but the experience here is merely the circumstance that I see before me this particular series of triangles. If I now gather from the intuition of these triangles by the aid of imagination, which conceives an extension of the base to infinity, the proposition that the sum of the angles—whose constant relation was previously demonstrated—is equal to two right angles, this proposition is by no means a judgment of experience. My experience consists merely in the fact that I have seen these triangles, and have found in them what I must recognise as universally true. The judgment of experience as such can at any time be refuted by a new experience. Men had observed the fixed stars to be motionless, as far as could be seen, for hundreds of years, and from this concluded that they are immovable.

This was a judgment of experience; it could be amended, and was amended, by more exact observations and calculations. Similar examples are afforded on every hand by the history of science. We are chiefly indebted to the pre-eminent logical talent of the French that to-day the exact sciences in all matters of experience no longer assert any absolute truths, but only relative ones; that we are always reminded of the conditions of the knowledge that has been gained, and the accuracy of all theories is based upon a reservation for increasing insight. This is not the case with mathematical propositions; they all alike involve, whether they are mere inferences or fundamental theories, the consciousness of absolute necessity. This consciousness, however, is not automatic; the propositions of mathematics, even the axioms, must no doubt once have been *discovered*. They must be ascertained either by the exercise of reflection and intuition, or by the rapid and happy combination of both. This discovery, however, essentially rests upon an accurate application of the mind to the problem. And therefore it is that mathematical principles are as easy to communicate to a learner as they are difficult to discover. The man who scans the heavenly spaces day and night until he has found a new comet may be likened to him who endeavours to win a new side for mathematical intuition. But just as the telescope may be so directed that any one with sound eyes must see the comet, so the new mathematical principle can be so exhibited that every one must recognise its truth who is capable at all of proper intuition, whether by means of a described figure or of a merely mental picture. The circumstance that mathematical truths are often sought and found with difficulty has accordingly nothing to do with what Kant calls their *a priority*. By this we must rather understand that the mathematical principles, as soon as they are ascertained by intuition, are immediately combined with the consciousness of their universality and necessity. Thus, for example, in order to show that 7 and

5 produce the sum 12, I shall employ intuition, and take a collection of dots, strokes, small objects, and so on. The experience in this case only amounts to this, that these particular dots, strokes, and so on have led me upon this occasion to this particular sum. If I am to learn by *experience* that it is always so, then I must *repeat* this experience until, through habit and association, the conviction is established in me, or I must institute systematic experiments to see whether, perhaps, in the case of bodies very different in kind, or irregularly arranged, or under other special circumstances, a different result may unexpectedly be given. This rapid and unconditional generalisation of what has once been seen cannot, moreover, be simply explained by the obvious similarity of all numerical relations. If the propositions of algebra and arithmetic are propositions of experience, then the conviction of the independence of all numerical relations of the constitution and arrangement of the bodies numbered would be the *very last* thing to occur to us, since all induction gives the more general propositions later than the particular ones. The proposition that the numerical relations are independent of the nature of the things numbered is rather itself *a prioristic*. That it is also synthetic may be easily shown. We might easily take away its synthetic nature by taking it up into the definition of what we would call numbers. Then we should straightway have a self-contained algebra, of which, however, we should not at all know whether it may be applied to objects or not. But every one knows that our conviction of the truth of algebra and arithmetic includes also the conviction of their applicability to all objects that we can meet with. The circumstance that the objects of nature, where we have to do, not with the numbering of separate bodies or parts, but with measuring and weighing, can never correspond to exactly determined numbers, that they are altogether incommensurable, does not alter this in the least. Numbers are, to any desired extent of accuracy, applicable to any kind of object. We are

convinced that an iron rod constantly subject to the effects of varying temperature in an infinitely small space of time has an infinitely exact and definite measure, although we can never have the means for completely ascertaining this measure. The circumstance that we only gain this conviction as a result of a mathematical and physical training does not lessen its *a priority*. We have to do in regard to knowledge *a priori*, according to Kant's incomparable definition, neither with innate ideas lying ready in the soul, nor with inorganic inspirations or incomprehensible revelations. Knowledge *a priori* develops itself in man just as much in accordance with law and from out of his nature as knowledge from experience. It is characterised simply by this, that it is combined with the consciousness of universality and necessity, and therefore as to its validity is independent of experience.

Here, of course, we have at once a point that, even to this time, is still subject to the most violent attacks. On the one hand, the *a priority* of mathematical knowledge is attacked, and, on the other, the synthetic nature of mathematical judgments is denied. The conception of mathematics is so important for the foundation of the Kantian philosophy, that we cannot avoid here an examination of both these points.

As to the *a priority* of mathematics, the liveliest controversy took place in England, where the influence of Hume has been most profoundly operative. Whewell, the meritorious philosopher and historian of Induction, maintained the doctrine of the *a priority* of mathematics, and of the origin of the necessity that we attach to mathematical propositions from a really *a priori* element—the *conditions* or the *form* of our knowledge. He was opposed by the astronomer Herschel and by John Stuart Mill, who agrees with Herschel in nearly all points.[9]

[9] The controversy of the English philosophers on this subject began by Whewell's attack in his 'Mechanical Euclid' on the view maintained by Dugald Stewart, that the fundamental doctrines of geometry are built upon hypothesis. An article written by Herschel in the 'Edinburgh Re-

The doctrine of these Empiricists is simply the following: Strict necessity rules in mathematics only so far as it rests upon definitions and upon inferences from these definitions. The so-called axioms are for the most part only definitions, or may be resolved into definitions. The rest, especially the fundamental propositions of Euklid's geometry, that two straight lines cannot enclose a space, and that two parallel lines produced to infinity never meet—these, the only real axioms, are nothing but generalisations from experience, the results of an induction. They lack, accordingly, that strict necessity that is peculiar to the definitions (in the Kantian sense, one might say, to all analytical judgments). Their necessity in our consciousness is merely subjective, and can be psychologically explained. It arises in the same way as we often attribute necessity to propositions that are not even true, or declare something to be unintelligible and inconceivable that we ourselves perhaps some time ago held to be true. Even though the mathematical axioms are thus entirely due to the association of ideas, and, psychologically considered, have no better origin than many an error, it does not, of course, follow from this that we must fear that they may some day be refuted; but it does follow that we have no other source for the certainty that we attribute to them than for our empirical knowledge generally, that appears to us probable, certain, or absolutely necessary, according to the strength of the induction from which it results.

view' defended Stewart's view. Whewell answered in his 'Philosophy of the Inductive Sciences' (London, 1840), i. 79 ff., in the section 'The Philosophy of the Pure Sciences,' which contains a special chapter (ch. v. p. 98 ff.) in answer to Herschel's objections. Herschel continued the controversy in a review in 1841 of Whewell's principal books ('History of the Inductive Sciences' and 'Philosophy of the Inductive Sciences') in the July number of the 'Quarterly Review.' Upon this Mill took up the contest in his 'Logic' (1843), and continued it in his later editions after Whewell had answered him in a special publication ('On Induction, with especial reference to Mr. Mill's System of Logic'). We have used the third edition of the original and the third edition of Schiel's translation (after the fifth of the original), Braunschw. 1868; besides Whewell's 'Philosophy of the Inductive Sciences.'

On this view, then, there are indeed synthetical judgments in mathematics, but they are not *a priori;* there are judgments *a priori*, but these are only the analytical, or, as Mill calls them, identical, judgments.

As applied to the objects of experience, all judgments on this view are only hypothetically valid. Nature nowhere supplies us with the pure forms of geometry, and no algebraic formula will ever represent the measure of a magnitude or of a force with absolute accuracy. We can only say, therefore, that *if* and *so far as*, for example, a planetary orbit corresponds to the line assumed by us, and called an ellipse, does it necessarily possess all those qualities that we deduce from this notion? But of none of these properties can we say in any but a hypothetical sense that it belongs to the planet's orbit; nay, even the actual course of the planet will never completely correspond to our theories.

This is the kernel of the doctrine; as to the polemic against Whewell, it is not perfectly fair and unprejudiced, although the long-continued controversy was on the whole very courteously conducted. Mill, who generally represents an opponent's views very candidly and clearly, does not always quote quite accurately, and puts many expressions of his opponent into an unjustifiable connection.[10]

[10] It is a great defect, to begin with, that Mill seldom in his very lengthy polemic gives Whewell's views exactly in his own words and in their true connection, but always slips in ideas in which the point at issue represents itself from his own standpoint. We will give a couple of instances of the resulting misrepresentations, quoting the original. In Bk. II. ch. v. § 4 (3d ed. i. 258): "It is not necessary to show that the truths which we call axioms are originally *suggested* by observation, and that we should never have known that two straight lines cannot enclose a space if we had never seen a straight line; thus much being admitted by Dr. Whewell, and by all in recent times who have taken his view of the subject. But they contend that it is not experience which *proves* the axiom; but that its truth is perceived *a priori* by the constitution of the mind itself, from the first moment when the meaning of the proposition is apprehended; and without any necessity for verifying it by repeated trials, as is requisite in the case of truths really ascertained by observation." The italicised words 'suggest' and 'prove' do not occur in Whewell in this sense and connection. This whole opposition of suggestion and proof supposes the superficial treatment of the Empiricists, to whom

The reason of this striking circumstance lies in this, that Mill has always before his eyes the phantom of the old innate ideas, and of the Platonic revelations from a supersensible world—the phantom that has so long played its part in metaphysic, and whose connection with confusions of the worst kind is well calculated to irritate a sober and unmystical opponent. It is the same reason that misled Ueber-

'experience' is something final, almost like a personal being opposed to the passive spirit. According to Whewell, in every act of knowledge a formal, active, and subjective element that he calls "idea" (in Kant the "Form") co-operates with a material, passive, and objective element, the "sensation" (in Kant's language "Empfindung" or "das mannigfaltige der Empfindung"). It is obvious that in the first recognition of an axiomatic truth *both elements co-operate*, as, in fact, like form and matter in an ivory spear they can only be separated in thought. Thus, too, there can be no question of an admission that experience without that formal element could suggest the axiom; still more merely from the fact that this first becomes active in combination with an external objective element. Just as little can insight into the truth of the axiom be separated as the demonstrative element from the sensible. When we speak, then, of the "constitution of the mind," this must not Platonically be referred to an 'intellectual intuition,' but to the form of the same sensibility, by which we receive from without impressions at all, and consequently experience. Very unequivocally says Whewell on this point ('Philos. of the Induct. Sciences,' i. 92): "The axioms require not to be granted, but to be seen. If any one were to assent to them without seeing them to be true, his assent would be of no avail for purposes of reasoning; for he would be also unable to see in what cases they might be applied." Again, in the same chap., § 5, "Intuition is 'imaginary looking' [with reference to Hist. Sci. Ideas, i. 140]; but experience must be real looking: if we see a property of straight lines to be true by merely fancying ourselves to be looking at them, the ground of our belief cannot be the senses or experience; it must be something mental." By this passage, in which Mill professes to give Whewell's view, Dr. Cohen has obviously been misled in 'Kant's Theorie der Erfahrung,' S. 96 (in a passage, I may add, that states Mill's relation to Kant with admirable clearness), into attributing to Whewell a doctrine related to the Leibnizian conception, which Mill would rightly object to. It is nothing of the sort; the expression "something mental" is simply introduced by Mill into Whewell; and then, too, the 'imaginary looking' must not be unduly pressed as an imaginary seeing, but simply as a seeing in thought. Whewell has no idea in the passage referred to of laying special weight upon the difference of seeing in imagination from actual seeing; nay, he expressly says, "If we arrange fifteen things in five rows of three, it is seen by looking, or by imaginary looking, which is intuition, that they may also be taken as three rows of five." Thus he expressly attributes the same value to actual seeing and to seeing in imagination for the process of knowledge. Whewell is therefore, in this point at least, an orthodox Kantian, which we are the more pleased to point out, as we failed to recognise this in the first edition, being also misled by Mill.

weg, in our own country, into bitter injustice towards the Kantian system, in which we were asked to find latent behind the "*a priori*" the whole apparatus of supernatural revelations. Kant's *a priori* is entirely different from that of the old metaphysic, and his whole conception of these questions stands indeed most distinctly opposed to the way in which Leibniz sets the truths of reason above the teachings of experience. We will speedily show how the Empiricism of Mill must be dealt with in a strictly Kantian sense; before that we will point out its weak points as they became apparent in the debate between Mill and Whewell.

The most obvious difficulty meets us at once in the axioms of geometry. Our conviction that two straight lines, if continued to infinity, cannot enclose a space, must be looked upon as an induction from experience, and yet of this, in the ordinary sense of the term, we can have no experience. Mill here admits that imaginary intuition must be substituted for actual intuition, but believes none the less that the proof is still inductive; that is to say, we may substitute observation of the image in our mind for observation of the external reality, because we know that our images faithfully represent the reality. But how do we know this? By experience? But then we only know that this correspondence exists with regard to finite distances.

A second difficulty consists in this, that the doctrine of the merely hypothetical validity of mathematics is insufficiently established. Whewell points out that the hypotheses of natural science are never *necessary*. They are more or less probable, but can always be replaced by others. But the propositions of mathematics are necessary, and therefore not absolutely hypothetical. Mill answers this with the apparently conclusive remark that *necessary* hypotheses are still hypotheses. Suppose that we see ourselves obliged, by the constitution of our mind, to assume that there are circles, right angles, and so on, is

not this assumption still only hypothetical, since we do not know whether there are anywhere in nature circles, right angles, &c., exactly conformable to our definitions? On the other hand, however, we may remark that it would be very absurd to let so important a question degenerate into a hollow dispute as to words. If there is a kind of hypotheses distinguished from all others by the necessity of their origination in our minds, we gain nothing by the general observation that they are still but hypotheses; what we must rather seek to discover is the real explanation of their special character. With regard, moreover, to the relations of the material world to our mathematical conceptions, we may add another important observation; and this is, that it is by no means correct to say that we make the hypothesis that there are bodies or things conformable to the definitions of mathematics. The mathematician develops his propositions by the aid of intuition through figures, without any reference to bodies, but is convinced at the same time that he can never anywhere meet with an object in experience inconsistent with these propositions. An external thing may not completely answer to any mathematical form: then we presuppose that its actual form is an extremely composite and perhaps variable thing, so that our simple mathematical intuitions cannot exhaust its whole nature. At the same time, however, we presuppose that it is determined in each infinitesimal portion of time with complete accuracy by the same mathematical laws of which we have mastered only the first elements.

Finally, we come to the kernel of the controversy: the notion of the necessity of mathematical judgments and its origin. Here Mill feels particularly strong in the historical demonstration that the human mind has often held as quite inconceivable what has afterwards been proved to be true, or, conversely, has held as necessary what has later been recognised as gross error. But it is just this that is the weakest point in all Empiricism; that is to say,

as soon as it is shown that our consciousness of the *necessity* of certain knowledge hangs together with our view of the notion of the knowing faculty, we have then finally decided on the main point against one-sided Empiricism, however wrong we may be in drawing a conclusion from this nature of the knowing faculty.

A simple illustration may make this clear. Suppose I see that contrasted colours gain a special brilliancy, this is at first an induction from repeated experience. I may conjecture that it will always be so, but I cannot know this. A new and unexpected observation may cancel my calculation, and oblige me to see a new and wider proposition cover the common elements of the phenomena. But now suppose I discover that the explanation of my observation lies in the constitution of my eye, then I shall immediately conclude that the observation must in all cases be the same. In order to examine the matter quite thoroughly, let us now assume that there is again some mistake; that, for instance, it is not the contrast in itself, but only some cause *usually* found in combination with contrast, that produces the effect in question. Then I may be obliged, just as in the first instance, to alter my judgment, although in the first case it was assertory, but in the second apodeictic. I might, in fact, before I had ever discovered the inaccuracy of my physiological hypotheses, have been obliged by a fact of experience to give up my supposed necessary judgment. What, then, does this prove? At all events, not that my hypothesis of necessity arises from experience; for I might have found it before any special experience at all. If I know, for example, that a telescope has spots on its glass, I know before I have tried that these spots *must* appear upon any object at which I direct the telescope. Suppose, now, I take the telescope, direct it upon the landscape, and see—no spots! What then? Materially my judgment was false, but the form of necessity entirely corresponded with the position. I knew the reason of the universality of the

expected phenomenon, and this is precisely what justifies me in adopting the apodeictic form as regards every particular falling within this case. Perhaps now I have confounded the spotted telescope with a clear one lying near it, or what I took to be a spot in the glass was a shadow, a spot in my own eye, or something else; in short, I have made a mistake, and yet I was quite right, so far as I could make a judgment at all, in giving my judgment an apodeictic form.

The highest degree of universality in our knowledge then clearly belongs to the knowledge that is conditioned by the nature of our knowing faculty, and in this sense alone are we justified in talking of inconceivable or of necessary things. But here we must point out, before distinguishing more strictly, that there is room not only for error, but for obvious misuse of the word. Men stand, as Mill has very rightly shown, so much under the influence of habit, that in order to strengthen a familiar notion, or to refute what seems an unnatural theory, they are only too apt to attribute things to the thinking faculty that are clearly mere subjects of experience. Where, however, we might really assume that the knowing faculty is concerned, as in the instance of the Newtonian laws, by which we declare *actio in distans* to be absurd, we can even then, it is true, be refuted by experience, whether because we have really mistaken the nature of the thinking faculty, or whether we have only, in an inference from it, overlooked an accompanying circumstance.

Mill, then, would believe that he has entirely gained his case, because he has shown that the proof of the truth of the assertion lies in experience; but we have not yet got so far. We are rather concerned with the origin of the apodeictic form of the predication. This is justified as soon as I gather my predication, not from the single observation, but from a universal source, and a source recognised to be universal.

We will now try, so far as it is possible at this stage, to

exhibit Kant's standpoint as clearly as possible. Let us go back to the axioms of Euklid. According to Mill, the proof of the proposition that two straight lines cannot enclose a space lies in experience; that is, it is an induction from experience in combination with imaginary intuition. From the Kantian standpoint very little objection can be made to this. That imaginary intuition should be reckoned as part of experience could at most afford a discussion as to words; that the view of the truth of the proposition is gained from sensuous intuition, and so in a sense arises inductively, is not Kantian in expression, but is, in fact, quite in harmony with Kant's notions.[11] The only difference is that Kant begins where Mill stops. Mill thinks that the matter is now fully explained: with Kant the real problem begins here. The problem is this: How is experience at all possible. We have not here to deal with the solution of this problem, but only to show that it exists—that there is here yet another question that empiricism cannot answer. And for this we use the proof that the consciousness of the necessity, of the absolute universality of the principle is there, and that this consciousness does not spring from experience, although it is first developed together with experience, or upon occasion of experience.

Here we recall the question: How do we know that our mental pictures of two straight lines are just the same as real lines?[12] The Kantian answer is: Because we ourselves cause this agreement; not, indeed, by an act of our individual will, but by the very nature of our mind, that must combine with the external impression in all our intuitions. Intuition in space, with all the fundamental

[11] Cp. Cohen, 'Kant's Theorie,' S. 95, where, upon Mill's proposition that the axiom that two straight lines cannot enclose a space is "an induction from the evidence of our senses," it is curtly observed, "This is thoroughly Kantian."

[12] Cohen, 'Kant's Theorie,' S. 6, observes: "But if we now ask, Whence do we 'know' and how can we know that the real lines are *exactly* like the imaginary lines? Mill answers that, in fact, there is no other certainty in mathematics. But this is to take back his account of mathematical evidence."

properties inherent in it, is a product of our mind in the act of experience; and for this very reason it is equally and necessarily inherent in every possible experience, as well as in every mental intuition. But this is to anticipate. Let the answer be what it may; for the present it is enough to have shown that we need an answer to this question. Even the question whether this judgment of necessity is strictly correct, and whence it arises, does not come yet. We shall see further on that this is not a psychological but a "transcendental" question, and we will try to explain this expression of Kant's. At present we are concerned with the existence of a judgment of necessity, and with the origin of this consciousness of necessity from another source than the merely passive part of experience.

We now proceed, then, to the attacks that are directed, not against the *a priori*, but the synthetic nature of mathematical judgments. Here the main attack is directed, not as before, against the conception of ideas of magnitude, but those of number, although, of course, the geometrical axioms also must be divested of their synthetic character, if the principle is to be consistently carried out. The latest notable advocate of this view, R. Zimmermann,[13] has written an essay 'On Kant's Mathematical Prejudice and its Consequences.' It would, indeed, be better to talk of Leibniz's mathematical prejudice, meaning by this the doctrine that from any simple propositions a whole science full of unforeseen results in detail can be developed by analysis! The strict deductions of Euklid especially have resulted in the obscuration of the synthetic factor in geometry by mere syllogising. Here we were supposed to have a science that develops all its results from the simplest beginnings merely by the aid of the principle of contradiction. To this error was due the prejudice that such a creation from nothing is possible by the mere magic of formal logic; for, in fact, what is wanted

[13] Sitzungsber. der Wiener Akademie, phil.-hist. Klasse, 67 Bd. 1871, S. 7 ff.

is a standpoint that admits the *a priori*, but must gain all its results analytically, and that is much concerned either to dispense with the axioms altogether or to resolve them into identical propositions.[14]

All such attempts bring us back at last to certain general notions of the nature of space, and these notions are, without the corresponding intuition, empty words. But that it is the general nature of space, as it is known in intuition, out of which the axioms flow, by no means refutes Kant's doctrine, but rather confirms and extends it. It is, moreover, a great mistake to suppose that the few principles that are premised as axioms, or even as a description of the general nature of space, exhaust the synthetic portions of geometry. Every construction that is employed for the purpose of a demonstration is of a synthetic nature; and it is at the same time quite wrong to admit with Ueberweg the synthetic nature of these factors, but to deny them all importance for the proof.[15] Ueberweg thinks that to the discoverer of mathematical principles mathematical 'tact' and an 'eye' for constructions may, indeed, be of special importance, but that for the scientific rigour of development this geometrical 'eye' possesses no more importance than tact in the selection of

[14] And therefore even Leibniz occupied himself with the reduction of atoms to certain general principles. Comp. his Essay 'In Euklidis πρῶτα,' in Leibn. Math. Schriften, hg. v. Gerhardt, 2 Abth. 1 Bd., quoted in Ueberweg's quite relevant review of Delboeuf's 'Prolégomènes philosophiques de la géométrie,' Liége, 1860, in the 37th vol. of the 'Zeitschr. f. Philos. u. phil. Kritik.' Ueberweg tries here, as he had tried before in 1851 (Leipziger Archiv für Philol. u. Pädog., Bd. vii. 1), in an essay on the Principles of Geometry, to show that the apodeictic character of mathematics is quite consistent with its origin from empirically acquired axioms. The attempts of Ueberweg, as well as those of Delboeuf and others, show that we may perhaps develop the general properties of space more rationally than was the case with Euklid, but that it is impossible to reduce them to ideas that would be intelligible without intuition.

[15] Ueberweg's 'System of Logic,' E. T., p. 346: "The force of the proof does not lie in the construction, but in the application, which it renders possible, of propositions previously proved, and, in the last instance, of axioms and definitions to the proposition to be proved, and this application is in its essence a syllogistic procedure. The construction is only the way of learning, not the way of knowing; the scaffolding, not the foundation."

appropriate premises in other deductions. But this is entirely to pass over the decisive point, namely, that we must *see* the construction, or represent it to ourselves in imagination, in order to conceive its possibility at all. This indispensableness of intuition extends, in fact, to the definitions, which here are by no means always purely analytical propositions. When, for instance, we define a plane surface as a superficies (Legendre), in which the straight line between any two points in it lies wholly in that superficies, we do not even know without the aid of intuition that we can unite all the points in a superficies by straight lines at all. We may try to combine syllogistically the bare definition of a superficies with the definition of a straight line without using any kind of intuition to help us; we shall not attain our end. Let us further consider any of the numerous demonstrations in which a property of the figures is demonstrated by superposition, in order to effect our object by an argument *ad absurdum*. Here we have to do, not, as Ueberweg thinks, merely with the choice of premisses, in order to effect our demonstration by the pure use of syllogism. We shall always make one of the premisses possible at all only by the help of an intuition—by covering with one figure the other! It does not, therefore, influence the main question whether, with Zimmermann, we declare the proposition that the straight line is the shortest way between two points to be analytic. This happens to be the very instance chosen by Kant to show the opposite. Kant finds nothing in his definition of the straight line out of which to get the notion of shortest distance.[16] Conceding that we can bring this idea into the definition, and thus make the proposition analytical, then there immediately emerge again other predications as to the nature of the straight line, which are, indeed, very 'evident,' but

[16] The proposition declared by Zimmermann (*loc. cit.*, S. 18) to be "thoroughly analytical" is circumstantially demonstrated by Ueberweg in the essay of 1851, quoted in Note 14: two different ways of getting free from the synthesis *a priori!*

only on the basis of intuition. Legendre, who also endeavoured to reduce the definitions as much as possible, has chosen such a definition; but immediately after it follows the addition: it is evident that if two portions of two straight lines coincide, these coincide also in their whole extent. But whence comes the evidence? From intuition!

No one, in fact, has yet succeeded, even in appearance or as an experiment, in entirely discarding the synthetic element from geometry; and Ueberweg, who has given unusual attention to this subject, saw himself therefore forced to the standpoint of Mill, who admits the synthetic element in geometry, but explains it from experience. Beneke, to whom Ueberweg, next to Mill, most attached himself, explains the universality of the synthetic geometrical propositions by the rapid comparison of an infinite number of cases. Because of the constant relation in which the different figures stand to one another (*e.g.*, an angle in a triangle varying through all degrees from 0 up to two right angles), this glance occupies an almost inappreciable time. No doubt, psychologically considered, there is some truth in this. But it will be gathered from the remarks on the first objection that it is a mere misunderstanding of the Kantian doctrine to suppose that it is thereby refuted.

Much stronger, as we have said, is the attack upon the synthetic nature of arithmetical propositions. Zimmermann maintains that the judgment $7 + 5 = 12$, which Kant calls synthetical, is not only analytical, but even identical. He will admit that in order to combine 7 and 5 we must go beyond the notion of 7, as well as beyond that of 5, but we do not as yet receive the judgment, but merely the notion of the subject $7 + 5$. But with this the predicate 12 is absolutely identical.

Pity that Zimmermann is not right! The teachers in our national schools could then save themselves the trouble of teaching Addition. When they had taught Numeration

all would be done. As soon as the child had acquired on its fingers or the board an intuition of 5 or of 7, and had besides learned that the number which follows 11 is called 12, it must at once be clear to him than 7 and 5 make 12, for the notions are identical! Against this there is a plausible objection, viz., that it is not enough to know that 11 and 1 are 12 in order to have the notion of 12. This notion would include in itself, in its complete development, the knowledge of all its modes of origin from 11 + 1, 10 + 2, 9 + 3, &c. This requirement may have a meaning for the mathematician, who develops the theory of numbers from an abstract principle, although we see that the same requirement is applicable to the origin of the 12 from its factors and any other kind of operation. Moreover, we might conceive a method of teaching arithmetic that should, at least, work through all the modes of origin, from the four rules in every single number proceeding from 1, on the same principle that we now go through these operations within the limit of 1 to 100 before proceeding to the larger numbers. In that case Numeration, Addition, Subtraction, Multiplication, and Division would be learned at the same time, and thus from the first a more adequate notion of figures would be acquired. As opposed to such possibilities, however, the proposition of Kant is justified by the simple fact that we do not proceed in this manner;[17]

[17] How little Kant here deserves the reproach of superficiality, covertly insinuated in Zimmermann's account of his doctrine, may be shown by the single observation, not noticed by Zimmermann, in which Kant guards against the confusion of the *combination* of 7 and 5 with the *addition* of them. There is, in fact, already contained in the notion of addition the adding of the units of the five to the series of those of the seven; so that, in fact, beginning with 8, we make five additions of one each time to the series of numbers, just the problem that children at school have painfully to learn when they have already learned to count. By "union of 7 + 5," then, Kant means, not that union which arises by going back to the sum of the units and counting them anew, but merely the combination of the already counted group 7 with the also counted group 5. More than this does not lie in the notion of union, nor in the original force of the sign +. But as we use this at the same time as sign of the operation of addition, Kant saw himself obliged expressly to guard against the misapprehension into which Zimmermann has fallen. Comp. Krit.

that as a matter of fact we prefer first to form the ideas of number, and then afterwards learn as something new what greater number arises if I resolve two smaller numbers into their units, and begin again to count them altogether.

It might still be objected that the learning of Addition is only an exercise in the use of words and signs to express a given number in the simplest way; that the mere idea of the number 12 is perfectly given by every single

d. r. Vern. Elementarl., 2. Th., 1 Abth., 2 B., 2 Hptst., 3 Abschn., Hartenst. iv. 157, E. T. Meiklejohn, p. 124.

If we say that Kant's principle would be justified by the mere fact that "we do not usually proceed so," we apply also, it is true, that the difference between analytic and synthetic judgments is merely *relative*, and so that the same judgment, according to the mental constitution and the ideas of the thinking subject, may be analytic or synthetic. Yet by no scientific treatment of the idea of number can we do away with the synthetic element of arithmetic; we can only bring it to another place, and more or less reduce it. So far, at all events, Kant is wrong in believing that there are innumerable such synthetic propositions in arithmetic (which therefore he calls not axioms but number formulæ). Their number depends rather from the system of numeration, since the synthesis of three tens and two tens is precisely the same function as the synthesis of three pebbles and two pebbles. Kant, indeed, maintained (Introd. to 2d ed., v. 1) that in the case of *larger* numbers their synthetic nature becomes specially prominent, as here we like to turn and vary the ideas as we will; without calling in intuition we should never find the sum by the mere dissection of the ideas. To this doctrine Hankel (Vorles. über die complexen Zahlen, 1 Thl., Leipz., 1867, S. 53), opposes the exact opposite. On our five fingers we may very well show 2.2 = 4, but it would be quite impossible to prove in that way 1000.1000 = 1,000,000. The latter view is undoubtedly correct, while as to the negative portion of Kant's assertion, it very much depends upon what we mean by the idea of a number. In reality operations with larger numbers are deduced neither directly from the idea nor directly from intuition, but are carried on throughout upon that system of subdivision into partial operations which is at the foundation of the systems of number, and which in the Arabic system of ciphers also has found its completely corresponding expression in writing. In ordinary life we confine ourselves almost wholly to the intuition of these *signs*, and that in the successive stages of the partial operations. That the intuition of the sign also is an intuition that can represent the intuition of *things* has been very well shown by Mill (Logic, B. ii. c. vi. § 2). The succession of partial operations we usually take up quite mechanically, but the rules of this mechanism are reduced scientifically by the aid of the *a priori* (according to Mill the 'inductive') principle, that equals added to equals make equals. With the aid of the same principle science can reduce the synthetic elements of arithmetic to a minimum, but can never entirely get

mode of its origin, whether it be by 1 + 1 + 1, &c., or 6 + 5, or perhaps by 9 + 3. Even this will not hold; for we receive every idea of number originally as the sensuously determined picture of a group of objects, whether they are only our fingers or the knobs and balls of a calculating machine. Here we may adduce the modes and expressions used in counting by primitive peoples and early culture as satisfactory evidence for the synthetic nature of

rid of them; and it holds, in fact, here too, as in Geometry, that not only in the first rudiments, but also in the progress of the science from time to time (here in this case of the transition to a new kind of operations) we cannot dispense with synthetic principles, acquired by the aid of intuition. Let me also add here that Sigwart too, in his Logic (Tübingen, 1873), too late to be noticed in the text, insists on the *relativity* of the distinction between Kant's analytic and synthetic judgments (S. 106 f.). Moreover, that the whole distinction, from a logical standpoint, is of very doubtful value, may be conceded without prejudice to the object served by the distinction in the 'Critick.' But when Sigwart maintains that all individual judgments of perception, as 'this rose is yellow,' 'this fluid is sour,' are analytic, then the definition of the analytical that underlies this view is of still more doubtful value than that of Kant. The judgment, 'this fluid is sour,' cannot be separated from the synthesis of ideas which Sigwart (S. 110) makes to precede as a separate act, without losing all definite signification. The judgment, 'this rose is yellow,' is logically almost as equivocal as the circumstances under which we can suppose it to be spoken. Even the judgment, 'the accused is guilty,' in the mouth of the witness (S. 103 Anm.) cannot be regarded as analytic, since the idea of the 'accused' is given to the speaker by the court, and he does not enounce his proposition in order to analyse this idea for himself, but in order to produce the synthesis of the ideas of the subject and the predicate in the judges or jury. It will, indeed, be quite useless to attempt to classify the infinite variety of the psychological contents of one and the same expression of language under other than merely relatively valid concepts. For the appreciation of the Kantian division, and the consequences based upon it, the question is unimportant, as Kant beyond doubt places the genesis of the judgment of experience in the moment of perception, even though the *spoken* judgment follows a moment later. So it is also in the judgment 7 + 5 = 12, which, according to Kant, we must regard as arising in the moment that the addition of the units reaches 12, and the synthesis (recognised by Sigwart also as necessary) of the ideas is thus completed; while, on the contrary, Sigwart makes this psychical act of the synthesis of the ideas precede, and then makes an (according to *his* definition, S. 101) analytic judgment (*i.e.*, one resolving the synthesis of ideas that has been reached once more into subject and predicate) follow a separate act. Even if we adopt Sigwart's definition, the essential part of Kant's assertion therefore remains, and must then only be referred no longer to the judgment, but to the psychical act of synthesis in the perception that makes the judgment possible.

ideas of number. And we find everywhere at the foundation the sensuous picture of the group or of the arrangement of the fingers used to represent the number.[18] As soon, moreover, as we start with Mill from the principle that all numbers are "numbers of something," and that the objects, the number of which is in question, produce by their quantity a definite impression upon the senses, we cannot doubt the synthetic nature of an operation that combines, whether in reality or in idea, two such groups of similar objects. And therefore, true to his principle, Mill shows too that it is a fact attained by experience that three objects arranged in a particular form still make the same total, if we put one of them a little on one side, so that now the total appears divided into two portions, as $2 + 1$.[19] How little Kant rejects this kind of "experience" is shown by the fact that, for the demonstration of the proposition $7 + 5 = 12$, he uses *intuition* through the five fingers, or even through points. Kant has only looked somewhat deeper into the "remarkable peculiarity," noted by Mill also, of propositions concerning numbers, "that

[18] Comp. Tylor, 'Primitive Culture,' ch. vii., 'The Art of Counting.' It is here shown that men counted on their fingers before they invented words for the numbers. Thus an Indian tribe on the Orinoco indicates the number 5 by 'a whole hand;' 6 is expressed by a term which means 'one of the other hand;' for 10 they say 'both hands.' Then comes the toes: so that 'a whole foot' means 15, and 'one to the other foot' 16; 'one Indian,' 20; 'one to the hands of the other Indian,' 21, and so on. A translation of the Bible into a Melanesian language renders the number 38 (John v. 5) by 'one man and both sides five and three.' How easily the signs and expressions thus arising fuse with the idea of the thing counted is shown especially by a striking grammatical construction in the Zulu language. Here the word 'forefinger.' or 'pointer' (of the second hand, in which counting begins with the thumb), makes the number 7. Consequently the sentence, 'there were seven horses,' is expressed by 'the horses have pointed.' When then, later, numerals were invented independently of finger-counting, the number was expressed by qualities of the objects from which the name was borrowed; *e.g.*, 'moon,' or 'earth' (because there is only 1) for 1, 'eye,' 'wing,' 'arm,' for 2. Characteristic, again, is a way of counting among the Letts: "They throw crabs and little fish, three at a time, in counting them, and therefore the word *mettens*, 'a throw,' has come to mean 3; while flounders being fastened in lots of thirty, the word *kahlis*, or 'cord,' becomes a term to express this number" (i., p. 233).

[19] Comp. Mill, System of Logic. B. ii. c. vi. § 2; and iii. xxiv. 5.

they are propositions concerning all things whatever, all objects, all existences of every kind, known to our experience," and that demonstration as to a single kind of objects is enough to convince us that it must be so with every possible kind of object. This, however, belongs to the previous objection: here we are concerned only with the synthetic nature of ideas of number, and here Mill seems in essentials to be of one mind with Kant.[20]

[20] We ought to notice here the effort of the mathematicians to free themselves entirely from the "limits of intuition," and to establish, apparently, a purely intellectual, intuitionless mathematic. So long as these efforts confine themselves to the sphere of the mathematical specialist, and avoid coming to any settlement with philosophical questions, it is not easy to know how far we have to face a conscious opposition to the Kantian view, or merely another mode of expression. In a certain sense, indeed, ordinary analytical geometry emancipates itself from intuition—that is, it sets in the place of geometrical intuition the incomparably simpler intuition of arithmetical and algebraical relations of magnitude. Recently, however, the thing has been carried much further, and the boundary between mere technical and mathematical assumptions and philosophical assertions seems to have been often passed, without any thorough understanding having been come to as to the point in question. Thus Hankel especially, in the work quoted in Note 17, has several times openly asserted that his "general doctrine of forms" is to set forth a mathematic purely intellectual, and freed from all intuition, "in which not quantities or their pictures, figures, are connected, but intellectual objects, things of thought, to which actual objects or the relations of each *may*, but not *must*, correspond." The universal formal relations, that form the subject of this mathematic, he calls also 'transcendental' or 'potential,' in so far as they involve the possibility of actual relations (i. S. 9 f.). Hankel protests expressly against this purely formal mathematic being regarded merely as a generalisation of ordinary arithmetic: it is "an entirely new science," the rules of which are "not proved, but only exemplified," by the ordinary arithmetic. But the 'exemplification' is just the intuitional proof for the synthetic basis of this new science, which can then, indeed, carry out the deductive method by means of its things of thought, just as algebra does by means of universal signs of number, and arithmetic by means of actual figures. In fact, one need with Hankel, as with Grassmann, the true inventor of this universal theory of form (comp. his thoroughly philosophical 'Lineale Ausdehnungslehre,' Leipz., 1844, and the larger and more strictly mathematical 'Ausdehnungslehre,' Berl., 1862), only examine more closely any one of the universal notions employed in order to discover at once the factor of intuition. How, for instance, can we know that words like 'connection,' 'permutation,' &c., mean anything unless we call in the help of the intuition of connected and permuted objects, even if there be only the letters *a*, *b*, and *b*, *a*? Something, too, may well depend upon this, that the "purely formal mathematic" has, in fact, been developed through the principle of generalisation, like the majority of the most

What the one-sided Empiricists do not observe is, that experience is no open door through which external things, as they are, can wander in to us, but a process by which the appearance of things arises within us. That in this process all the properties of these 'things' come from without, and the man who receives them has nothing to do, contradicts all the analogy of nature in the case of any development of a new thing from the co-operation of two others. Though the 'Critick of Pure Reason' may go much beyond the picture of a combination of two forces in a resultant third force, yet there can be no doubt that this picture may serve to give us a first idea of the matter. That *our* things are different from things *in themselves* may be made plain to us, therefore, even by the simple opposition between a tone and the vibrations of the string that occasions it. Inquiry recognises, indeed, yet other phenomena in these vibrations, and at length, attaining its goal, removes the 'thing in itself' into the unattainable sphere of a mere thing of thought; but the justification of criticism and the meaning of its first preparatory steps we may very well realise to ourselves through this opposition between the tone and what occasions it from without. What in us, whether we conceive it physiologically or psychologically, makes the vibration of the string become a tone is the *a priori* in this event of experience. If we had no sense but hearing, then all experience would consist of sounds; and however much all the rest of knowledge might then follow from experience, yet the nature of this experi-

important advances made by mathematic in modern times. It loses no importance on this account; and we must not consider it impossible that, by the same principle and in the same path, starting from mathematic, a new light may be won for logic also. We shall mention again below the inquiries of Riemann and Helmholtz, which border on the transcental (in a philosophical sense). Here let us only observe that, as against them, J. C. Becker has maintained the importance of intuition in the Kantian sense, with thorough knowledge of the subject, in his 'Abhandlungen aus dem Grenzgebiete für Mathematik u. der Philosophie,' Zurich, 1870, and in the 'Zeitschr. für Mathem. u. Physik,' u. 17 Jahrg., S. 314 ff.; 'Ueber die neuesten Untersuchungen in Betreff unserer Anschauungen vom Raume.'

ence would be entirely determined by the nature of our hearing, and we could say, not with probability, but with demonstrative certainty, that all phenomena must consist of sound. We must not overlook, therefore, that the origin of experience differs entirely from a conclusion from experience. The fact that we have experience at all is, however, determined by the organisation of our thinking,[21] and this organisation exists *before experience*. It leads us to distinguish individual marks in things, and to conceive in succession what is in nature inseparably fused and simultaneous, and to lay down this conception in propositions with subject and predicate. This is all not only *before* experience, but it is the condition of experience. Nothing else than to seek out these first conditions of all experience in thinking and in sense is the immediate aim of the 'Critick of Pure Reason.' Kant showed first of all, in the instance of mathematics, that our thought is actually in possession of certain knowledge *a priori*, and that even the common understanding is never without such know-

[21] In the first edition the phrase here was 'faculty of thought' (Denkvermögens), when this expression was used in that generality with which Kant frequently speaks of the faculties of the soul; so that, without any reference to a particular psychological theory, the mere possibility of the function in question is understood by it. We have preferred to remove even this reminiscence of the Scholastic view of the psychological. For the rest, we may observe here that the well-known polemic of Herbart against the theory of the faculties of the soul only touches a certain popular, although widely-spread, modification of it. The true scholastic theory was never any other than this, that in all psychical acts the same one and only soul is engaged, and that the 'faculty' is not a separate organ, but only the (objectively conceived) possibility of this particular activity. Thus the matter still stands with Wolff, as soon as we keep to his definitions, and not to the explanations which are very often based upon the popular notion of faculties, on the analogy of bodily organs. Kant went still further in his abstraction from the psychological, since he could not, of course, presuppose any one unified soul-essence at all. With him, therefore, the faculty of the soul is throughout merely the possibility of the function of an unknown subject, and he obviously only clung to the theory of faculties because he believed that in it he really possessed a tabular view and classification of phenomena that might be of use. The consequences of this classification, at the same time, carried him often far from his goal. Why we have not retained the by no means strictly Kantian expression, 'organisation,' or its synonym, 'disposition,' will be explained further on.

ledge. Proceeding from this, he seeks to show that not only in mathematics, but in every act of knowledge, *a priori* elements co-operate, which throughout condition our experience.

But how are these elements to be discovered? Here is a dark point in the Kantian system, which the most careful inquiry into the exact meaning of the great thinker will hardly ever be able to dispose of. At the same time, we may with the utmost certainty refute a widely spread misapprehension in connection with this question. The following dilemma has been thought justifiable: either the *a priori* elements of thought are themselves deduced from an *a priori* valid principle, or they are sought out empirically. Such a principle is not to be found in Kant, and the empirical process can afford no strictly necessary results; and hence the whole transcendental philosophy of Kant is in the most favourable view nothing but a section of empirical psychology. It has even been maintained that apodeictically valid propositions must also be deduced apodeictically, and therefore from an *a priori* valid principle.[22] As though the question were to prove these propositions! Kant is only concerned to *discover* them, and for this he has no other clue than the question, What must I

[22] So especially Kuno Fischer and Zimmermann, partly agreeing with him, in the essay mentioned above (Note 13), on 'Kant's Mathematical Prejudice,' S. 24–28. J. B. Meyer, in 'Kant's Psychologie,' S. 129 ff., has very well described the discovery of the *a priori* by means of steadfast reflection. Comp. also Cohen, 'Kant's Theorie der Erfahrung,' S. 105–107. Cohen condemns the proposition of J. B. Meyer: "On this point Kant has never expressed himself clearly, that we do not acquire the *a priori* forms of experience, but yet do attain the consciousness of this possession by reflection upon experience." In this form the objection to Kant seems, of course, unjustifiable; but we must, on the other hand, insist that Kant has not sufficiently considered that reflection or experience is also an inductive process, and cannot be anything else. The universality and necessity of mathematical principles is, it is true, not gathered from experience (of mathematical objects), but discovered by reflection. This reflection, however, cannot take place at all without experience—not of the objects of mathematics, but of mathematic as object. But from this it follows that the pretension to the entire discovery of everything *a priori* is untenable; and Kant makes this pretension, supporting himself, of course, not upon an *a priori* deduction of the *a priori*, but upon a supposed indisputable classification of what is given in logic and psychology.

presuppose in order to explain the fact of experience? The psychological side of the question is not only not the chief point with him, but he obviously tries to avoid it, since he puts his question so generally that the answer is equally consistent with the most various psychological theories.[23] Deduction from a metaphysical principle, such as was undertaken by his successors from Fichte on, could be no part of Kant's purpose, if only because this would have already presupposed the metaphysical method, the rights and the limits of which he proposes to investigate. There thus remained to him only the mode of ordinary reflection, methodical indeed, but starting from facts. That Kant consciously trod this path seems sufficiently proved, but so much is clear that he must have deceived himself as to the consequences of this procedure; otherwise he could not have so sharply emphasised the absolute sureness of his procedure, and so contemptuously rejected all mere probability, as he has repeatedly done.[24] This was

[23] The greatest portion of all the obscurities of the 'Critick' flow from the single circumstance that Kant undertakes what is, on the whole, a psychological investigation without any special psychological presuppositions. What seems to the beginner an often uselessly involved expression has its reason always in this fact, that Kant endeavours to carry on his inquiry into the necessary conditions of all experience with such generality, that it fits equally well with any assumption as to the transcendental nature of the soul, or, more correctly, without presupposing anything whatever as to the nature of the soul, nay, without even assuming a soul at all as a separate entity independent of the body.

[24] In the preface to the first edition (1781) Kant says: "As regards *certitude*, I have fully convinced myself that in this sphere of thought opinion is perfectly inadmissible, and that everything that bears the least semblance of an hypothesis must be excluded, as of no value in such discussions. For it is a necessary condition of every cognition that is to be established upon *a priori* grounds that it shall be held to be absolutely necessary; much more is this the case with an attempt to determine all pure *a priori* cognition, and to furnish the standard—and consequently an example—of all apodeictic (philosophical) certitude." This *rôle* might very well be applied in favour of the (otherwise quite unreliable) interpretation of Kuno Fischer (comp. Note 22), if it were not that we can see from the same preface that Kant had then in view only the general deduction of the categories as a presupposition of all experience (S. 92 ff. of the first edition), and that, on the other hand, he was entangled in the prejudice that "the common logic" supplied an example that "all its simple actions may be fully and systematically enumerated," so that the supposed certitude here in the discovery of the complete table of categories is not the

an effect of the metaphysical school in which Kant had grown up, and the over-estimate of the value of the preparations that he thought he would find for his purpose, especially in the traditional logic, seems to have strengthened him in it. He failed to see that his method for the discovery of the *a priori* in reality could be nothing but the method of induction.

It may, indeed, seem very obvious that the rudiments of our knowledge *a priori* must be also discovered *a priori* by pure deduction from necessary concepts; and yet this assumption is erroneous. We must distinguish between a necessary proposition and the proof of a necessary proposition. Nothing is more easily conceivable than that the *a priori* propositions are only to be discovered by the road of experience; indeed, that the border between really necessary knowledge and between mere assumptions from which we might with increasing experience emancipate ourselves is a vanishing one. As in the case of the nebulæ of the starry heaven there is the utmost probability that some of them really consist of nebulous masses, while the telescope resolves them, one after the other, into a cluster of single stars: so there is nothing to be said against it

certitude of a deduction from principles *a priori*, but the certitude of a complete view of what is supposed to be given. Even the strong passage in the 'Prolegomena,' 1783, S. 195 ff., where Kant deprecates "trifling about probability and conjecture," and declares that "Everything that is to be cognised *a priori* is thereby announced as apodeictically certain, and must therefore be proved in this way," does not mean that even the existence of such knowledge must be deduced from a principle *a priori*. The content rather of this knowledge is *a priori* certain; but its existence, according to Kant, is inferred by sure inferences, according to the law of contradiction from an inwardly perceived fact. We must, moreover, expressly observe here, that this explanation is only abstracted from Kant's actual procedure, and that we have, in fact, no unequivocal proof that Kant was quite clear as to the methodical foundations of his great undertaking. It is rather not at all improbable that Kant in this point had not yet got sufficiently beyond the views of his 1763 essay, 'Ueber die Evidenz in Metaphysischen Wissenschaften,' although they are entirely incompatible with the standpoint of the 'Critick.' If we have, therefore, in this point also, from a balance of reasons, modified the view taken in our first edition of Kant's procedure, yet we cannot but point out that passages like those above quoted, and many similar ones, must have thrown a strong weight into the opposite scale.

when we, in a long series of Kant's fundamental ideas and highest principles, destroy the appearance of *a priori* knowledge, and nevertheless hold fast to this, that there are actually fundamental ideas and principles, which are present in our mind before all experience, and by which even experience is psychologically obliged to order itself. Mill has at all events the merit of having shown that a great number of propositions have been looked upon as *a priori* that have later turned out to be false. Defective as his attempt is to derive mathematical principles from experience, that service remains undiminished. It is certain that the consciousness of the universality and necessity of a proposition can deceive; only, of course, this does not prove that such propositions are then always derived only from experience. Mill himself talks, although not quite in the right sense, of errors *a priori;* and there are, in fact, many of them. It is with *erroneous a priori* knowledge not otherwise than with *a priori* knowledge *generally.* It is for the most part not an unconsciously acquired result of experience, but a proposition whose necessity is given before any experience by the physico-psychological organisation[25] of man, and which therefore appears imme-

[25] The expression 'the physico-psychical organisation' is perhaps not happily chosen; but it is an attempt to indicate the idea that the physical organisation, as *phenomenon*, is at the same time the psychical one. This goes, indeed, beyond Kant, but not so far as might at first sight be supposed, and in a point that can be defended; while, at the same time, the modification gives a very intelligible and easily conceivable notion, instead of the scarcely comprehensible Kantian idea of transcendental presuppositions of experience. The whole difference lies in this, that Kant, for the wholly incomprehensible notion that lies in the thing-in-itself at the bottom of the synthetic judgment *a priori*, substitutes the *notions* as something unattainable by us, and that he speaks of these notions, the categories, as if they were the *origin* of the *a priori*, though they are at most only its simplest expression. If we wish to denote the true cause of the *a priori*, we cannot speak at all of the 'thing-in-itself,' for the idea of the cause does not reach to this (or, what is the same thing, a judgment in relation to this has no other significance than as a rounding off of our circle of ideas). For the 'thing-in-itself' we must *substitute the phenomenon.* Even the *notion* is only phenomenon; but when we put it in the place of the *cause of the notion*, or regard it as it were within the phenomenal as ultimate cause, we fall into a Platonism which is a much more dangerous deviation from the critical principles than the

diately upon the earliest experience, without the intervention of induction; which nevertheless, with the same necessity, by means of deeper-lying *a priori* notions, is upset as soon as a certain series of experiences has given the preponderance to these deeper-lying notions.

The metaphysician, then, must be able to distinguish the *a priori* ideas that are permanent and essentially rooted in human nature from those that are perishable, and correspond only to a particular stage of development, although both kinds of *a priori* knowledge are bound up in the same way with the consciousness of necessity. For this, however, he cannot employ again an *a priori* principle, and therefore also not the so-called pure thought, just because it is doubtful whether the foundations of this have permanent worth or not. We are therefore confined in the searching and testing of the universal propositions which do not arise

choice of the expression, 'organisation.' In a word, by the absolute and obviously well-considered rejection of the notion of organisation, that must have been very near to him, Kant avoids the mere appearance of Materialism, to fall a prey to an Idealism that he has himself elsewhere rejected. If we attempt to escape this dilemma, the whole 'Critick of Reason' resolves itself into a mere tautology, to the effect that the synthesis *a priori* has its cause in the synthesis *a priori*. If we admit, on the other hand, the notion of organisation, not only does the tautology disappear (which, however, affords the simplest, though the most incorrect, interpretation of the 'Critick of Reason'), but also the obligation to hypostasise the categories Platonically. In return, as we have said, there remains the *appearance* of Materialism; but this appearance every consequent interpretation of the theoretical part of the Kantian philosophy must take upon itself.

Where the difficulties lay, and how near the notion of organisation must have been to the transcendental inquiry, is best shown by Reinhold's 'Theorie des menschl. Vorstellungsvermögens' (Prag u. Jena, 1789), as is well known, an attempt to solve the problem of the 'Critick' in a new way. Here the 'Theorie des Vorstellungsvermögens überhaupt' begins at once with a definition of it by the 'conditions' of ideation; in this avoidance of all special metaphysical and psychological—but also in the inclination to tautology—it is genuinely Kantian. There ensues a long exposition (S. 195–199), turning chiefly upon an attempt to show that we may not introduce the organisation into the explanation of the faculty of ideation, because philosophers are not agreed whether this faculty is based in mere organisation (Materialists), or in a simple substance without any organisation, or in some kind of co-operation of these factors. We see, then, clearly that what is here spoken of is the organisation as thing-in-itself, as otherwise it could not be placed in a line with the pure transcendental monads and other inventions of metaphysic. If, on the other hand, we take the organisation

from experience merely to the ordinary means of science; we can only set up probable propositions, whether the ideas and forms of thought that we must now, without any proof, assume as true, arise from the permanent nature of man or not; whether, in other words, they are the true root-ideas of all human knowledge, or whether they will turn out some day to be mere "delusions *a priori*."

Let us go back now to Kant's decisive question, How are synthetic judgments *a priori* possible? and the answer is, Because in all knowledge is contained a factor which springs not from external influences, but from the nature of the knowing subject, and which for this very reason is not accidental, like external impressions, but necessary, and is constant in all our experience. It is, then, our business to discover this factor, and Kant hopes to

as phenomenon, and therefore with the proviso that it may be phenomenon of an unknown thing-in-itself, not only does the Materialism disappear, but also all right ceases to co-ordinate this view with the inventions of metaphysicians. These, then, may continue to assume that at the bottom of this organisation there is nothing further (Materialism), or the activity of a monad (Leibnizian Idealism), or something absolutely unknown (Criticism). As phenomenon, however, the organisation is *given*, while everything else is but cobwebs of the brain. But, for this very reason, it seems to me a necessity to bring this one thing that is given, in which all the peculiarities of human nature, so far as we know them, run on the thread of causal relation, into connection also with the faculty of ideation, or with the cause of the synthesis *a priori*. We must not then, however, as Otto Liebmann, for instance, does, talk of the organisation of the *mind*, for this is transcendental, and therefore co-ordinated with other transcendental assumptions. We must rather understand by organisation simply, or physico-psychical organisation, what to our external sense appears to be that part of the physical organisation which stands in the most immediate causal relation with the psychical functions, while we may hypothetically assume that at the basis of this phenomenon there lies a purely spiritual relation of the things in themselves, or even the activity of a spiritual substance. Rightly to appreciate Kant's attitude to this conception of the cause of the *a priori*, we must consider, besides many equally important but less distinct passages, especially the conclusion of the 'Critick' of the Second Paralogism of the Transcendental Psychology, in the first edition (1781), S. 359 u. f. "In this way, what in one respect is called corporeal would in the other be at the same time a thinking being, whose thoughts indeed we cannot, but the signs of them as phenomenon we can, perceive. Thereby would fall away the expression that only souls (as particular kinds of substances) think; we should rather have to say, as we commonly do, that men think, *i.e.*, that that which, as external phenomenon, is extended, is internally (in itself) a subject which is not compound but simple, and thinks."

attain his object by regarding one by one the chief functions of the mind in cognition, without troubling himself with their psychological connection, in order to see what *a priori* elements occur in them. For this purpose he assumes two main sources of human knowledge—sense and understanding. With profound insight he observes that both perhaps spring from a common, unknown root. This conjecture may now be considered as already confirmed; not by Herbart's psychology nor Hegel's 'phenomenology of spirit,' but by certain experiments in the physiology of the sense-organs which irrefutably prove that, even in the apparently quite immediate sense-impressions, processes co-operate which, through the elimination or completion of certain logical connecting links, strikingly correspond to the conclusions, true or false, of conscious thought.

Kant has not rightly estimated the value of the idea that sense and understanding perhaps spring from a common root, for the purposes of his 'Critick of Pure Reason,' although the question must have presented itself whether the true solution of the transcendental problem is not to be sought precisely in the unity of sense and thought. He teaches, indeed, also that both factors must co-operate in knowledge, but even in the way of conceiving this co-operation he betrays a considerable remnant of that Platonising doctrine of a pure thought, free from all elements of sense, which ran through the whole traditional metaphysic, and at last found an expression that leavens the whole system of Leibniz, and dominates the views of the school of Wolff. According to Leibniz, only pure reflection is able to conceive things clearly and in their essence, while the knowledge of the senses is not an equally valid source of knowledge of another kind, but something absolutely inferior; it is confused knowledge, and therefore an obscure and troubled analogon of that which pure thought furnishes in the highest perfection. What Kant establishes by way of reform against radically false views is amongst his best work; what he retains of the old

modes of thought belongs to the worst weaknesses of his system.

His merit is that he has raised sense to the level of a source of knowledge equally valid as understanding; his weakness, that he allowed to continue at all an understanding free from all influence of the senses. Excellent is his doctrine that all thought must ultimately fall back upon intuition, that without intuition no object of our knowledge can be given us at all; inadequate, on the other hand, is the view that, in fact, mere intuition, without any co-operation of thought, affords no knowledge at all, while mere thought, without intuition, still leaves *the form* of thought.[26]

His method of discovering by the isolation of sense what *a priori* elements are contained in it may, at all events, awake justifiable hesitation, because it rests upon a fiction whose methodical success there is nothing to guarantee. In no act of knowledge can isolated sense be observed, as it were, in its function. Kant, however, assumes that this may happen, and the result of this assumption is the prin-

[26] It is of course still a problem of the future to show that there is no such thing as 'pure thought' in the sense of the metaphysicians, from whom Kant in this point cannot be excepted. Kant leaves the senses purely passive; accordingly the active understanding, in order to produce merely a picture in space of sensuous objects, must create the unity of the manifold. In this absolutely necessary and subjective act of synthesis, however, there is involved nothing of what we otherwise call 'understanding.' Only on the artificially imported supposition that all spontaneity belongs to 'thought,' all receptivity to sense, can the synthesis of *impressions to things* be at all connected with the understanding. When we find, however, that the synthesis of the impressions in the thing presupposes the category of substance, we must ask, As category? and the answer can only be in the negative. Rather is the sensuous synthesis of the impressions the foundation out of which a category of substance is first developed. A complete proof of the original sensuousness of all thought would here lead us too far. Let it only be remarked, that even the apodeictic character of logic must be referred entirely to sense-pictures of ideas, and that the much despised asses' bridges of logical circles (or lines, angles, &c.), far from being a merely didactic importation (Nebenwerk), rather contain in themselves the foundation of the apodeictic character of logical rules. The proof of this I have been in the habit of giving in my Logic Lectures for some years, and hope, if I am permitted to work some years longer, to be able to submit it to a wider audience.

ciple that the *a priori* element in intuition must be the form of the phenomena, the matter of which is given by sensation. This necessary and universal form of all phenomena, however, is for the external sense Space, for the internal Time.

The proof is not without several defects; especially the limitation of the *a priori* to space and time is not convincing. We might still ask whether motion ought not to be added: we can perhaps show that several categories are in truth not pure ideas of the understanding, but intuitions; as, for instance, that of a persistent substratum in change. Even the qualities of sense impressions, as colour, tone, and so on, do not deserve perhaps to be so utterly rejected as something individual, as a subjective thing out of which no *a priori* principles can flow, and which therefore can found no objectivity. Above all, however, is the principle doubtful by which Kant proposes to show that the regulative form must be *a priori;* the principle, namely, that sensation cannot again regulate itself upon other sensations. Among the scanty beginnings of a future scientific psychology appears a principle which teaches us that—within ordinary limits—sensation increases with the logarithm of the corresponding stimulus; the formula $x = \log. y$, which Fechner has made the basis of his 'Psychophysics,' as the 'law of Weber.' It is not improbable that this law has its ground in consciousness itself, and not in those psycho-physical processes that lie between the external (physical) stimulus and the act of consciousness.[27] We may therefore without violence (names must be subordinate!) distinguish between

[27] Recent inquiries seem, indeed, to show the contrary, but the matter still needs confirmation. The result of inquiries by Dewar and M'Kendrick as to change in the electromotor power of the optic nerve by the influence of light on the retina is, that the change is not proportional to the quantity of light, but to the logarithm of the quotient, from which it is concluded that the psycho-physical law of Fechner does not originate from consciousness, but from the anatomical structure and the physiological qualities of the organ itself. Cf. 'Nature,' No. 193 (10th July 1873), tr. in 'Naturforscher'), vi., No. 37 (13th September 1873).

the quantum of sensation (y) forcing itself upon consciousness and the quantum taken up by consciousness (x). This being presupposed, the mathematical formulas to which we are led by exact inquiry express at bottom nothing else than that the quantum of sensation forcing its way every instant is the unity by which consciousness measures on each occasion the degree of the increase to be taken up.

As sensation may very well measure itself by other sensation in point of intensity, so it may order itself in the representation of juxtaposition according to the already existing sensations. Numerous facts show that sensations do not group themselves according to a ready-made form, the idea of space, but, on the contrary, the idea of space is itself determined by our sensations. A composite line consisting of numerous sensible particles is, to the immediate consciousness, always longer than a mathematically equally long line, which offers no special supports for the exciting of sensations. For this very reason, indeed, our ordinary ideas of space are utterly unmathematical, and an inexhaustible source of subtle illusions, because our sensations find no ready-made system of co-ordinates in the mind to which they could surely arrange themselves, but because such a system develops itself, in some unknown way and with great imperfection, only from the natural competition of sensations.

For all that, the thought that Space and Time are forms which the human mind lends to the objects of experience is by no means such as to be rejected straight away. It is just as bold and magnificent as the hypothesis that all the phenomena of a so-called physical world, together with the space in which they are disposed, are only ideas of a purely intellectual nature. But while this *material* Idealism always leads into bottomless speculations, Kant, with his formal Idealism, opens only a glance into the depths of metaphysic, without losing the connection with the sciences of experience. For, according to Kant, those

forms of our knowledge that exist prior to experience are only through experience able to afford us knowledge, while beyond the sphere of our experience they lose all significance of any kind. The doctrine of 'innate ideas' is nowhere more completely refuted than here; for while, according to the old metaphysic, innate ideas are, as it were, witnesses from a supra-sensuous world, and able, indeed absolutely adapted, to be applied to supra-sensuous things, according to Kant the *a prioristic* elements of knowledge serve exclusively for the use of experience. By them all our experience is determined, and by them we know all necessary relations of the objects of our experience; but just because of their nature, as form of all human experience, every attempt to apply the like forms to supra-sensuous things is vain. It is true indeed that the question here easily arises, What is all the knowledge of experience if we only find the laws created by ourselves again in these things, which are no longer things at all, but only 'phenomena'? Whither leads all our knowledge if we must represent to ourselves the *absolutely* existing things, the 'things-in-themselves,' without space and time, and therefore in a manner quite inconceivable to us? To these questions let us for the present only put this question in reply: Who, then, says that we are to occupy ourselves at all with the, to us, inconceivable 'things-in-themselves'? Are not the natural sciences in every case what they are, and do they not accomplish what they accomplish, quite independently of the ideas as to the ultimate grounds of all nature to which we are ourselves conducted by philosophical criticism?

Looking at things from this side, then, we have no occasion to reject without examination the doctrine of the *a priority* of space and time. But even the doubts that we have raised as to the psychological origin of the idea of space are by no means sufficient to bid us reject it.

Nor does our view of the origin of ideas of space from sensation dispose of the question. It is a very different

thing whether the ideas of space are regarded in their development, or whether the question is put how it comes that we conceive at all in forms of space, *i.e.*, that our sensations in their co-operation produce the idea of a co-existence measurable in three dimensions, to which then, as it were as a fourth dimension of all existence, the idea of time associates itself. Even if space and time are not ready-made forms, which have only to fill themselves with matter through our intercourse with things, yet they may be forms that, through organic conditions, which might be wanting in other things, necessarily develop themselves out of our mechanism of sensation. Indeed, in this more strictly limited sense it could hardly be possible to doubt the *a priority* of space and time, and the question will much rather turn upon what Kant calls the 'transcendental ideality' of space and time, *i.e.*, upon the question whether space and time *beyond* our experience have no further significance. This is what Kant undoubtedly supposes. Space and time have reality, according to him, for the sphere of human experience, in so far as they are necessary forms of our sensible intuition; outside it they are, like all ideas that stray beyond the sphere of experience, mere delusions.

Here now the thing lies obviously so, that the psychological arrangement by virtue of which we are compelled to intuite things in forms of space and time is at all events given before all experience; and so far as the very first sensation of an external thing must be connected with an idea of space, however vague, so far is space an *a priori* given mode of sensible intuition. But that there exist 'things-in-themselves,' which have a spaceless and timeless existence, Kant could never prove to us out of his principles, for that would be a transcendental, even though negative, knowledge of the properties of the 'thing-in-itself,' and such a knowledge is, on Kant's own theory, entirely impossible. This, besides, is not Kant's view: it is enough for him to have shown that space and time have absolute validity for all experience, only because they lie as

forms of experience in the subject, and cannot therefore extend their validity beyond the sphere of their function. Nothing, on the other hand, hinders us, if we wish to tread this doubtful province, from conjecturing that their sphere extends further than the limit of our ideas.[28] Kant himself, in fact, occasionally expresses the conjecture that "all finite thinking beings must necessarily (*i.e.*, according to a general principle unknown to us) in this respect (in the mode of intuition in space and time) agree with man."[29]

[28] I need not say that there is here no idea of adopting Trendelenburg's 'Lückentheorie,' for Trendelenburg not only requires space to be at once subjective and objective, but he proclaims also a causal connection between the two, and believes that Kant has overlooked such a possibility, whereas Kant expressly bases the universality and necessity of space and time, and therefore his "empirical realism," upon the fact that these forms are only and *exclusively* subjective. See the careful treatise of Dr. Emil Arnoldt, 'Kant's Transcendentale Idealität des Raumes u. der Zeit,' Konigsberg, 1870 (reprinted from the 'Altpreuss. Monatsschrift.,' Bd. vii.), as well as Dr. Cohen ('Kant's Theorie der Erfahrung,' v. S. 62–79.) In order to prevent misunderstanding, however, to these statements, which, in the strict connection of the system, are entirely right, we must add the remark that Kant could never have wished to prove that things-in-themselves are without time and space; the whole standpoint of the 'Critick' makes it impossible. He is quite content to have shown that space and time (of which we only know anything at all by the means of our *ideas*) beyond experience have absolutely no significance. If Kant, instead of the stricter phrase that our idea of space "has no meaning," sometimes shortly says, "Space is nothing," yet this is always to be taken in the same sense: *our* space, and we know no other. Of other beings (cf. the next note), we may well conjecture that they also have ideas of space, but of spatiality (Räumlichkeit), as property of things in themselves, we cannot even understand the possibility. So far and no further goes the denial. If any one now by means of a *conjecture*, which is absolutely outside the system, will assume that extension in three dimensions belongs to things in themselves, Kant will never make him another reproach than that he is dreaming. There can be no question of a demonstrated impossibility of objective *space in this sense;* we can only maintain that any extension of the properties of the space *we know* to this *imaginary* space (comp., *e.g.*, infinity) is unjustified, and thus in fact the imaginary notion would become a mere empty phrase.

[29] Cf. 2te Ausg., S. 72, at the end of the General Remarks on Transcendental Æsthetic (iii. 79 Hart., E.T. Meiklej. 43): "It is, moreover, not necessary that we should limit the mode of intuition in space and time to the sensuous faculty of man. It may well be that all finite thinking beings must necessarily in this respect agree with man (though as to this we cannot decide), but sensibility does not on account of this universality cease to be sensibility," &c. In the sequel the oft-recurring suggestion is made, of course again outside the system, that another mode of apprehension, namely, 'intellectual intuition,' seems to belong wholly to the Supreme Being (God). This phantom of an intellec-

But this means, in other words: It may be that all knowledge of objects is necessarily like ours; any purely problematical divine mode of knowledge, however, excepted. On the other hand, we may also admit that, *e.g.*, we can conceive creatures that by virtue of their organisation are not at all in a position to measure space by three dimensions, that perhaps conceive it only in two dimensions, perhaps in no clear dimensions at all. In accordance with this we cannot again deny the possibility of a conception that rests upon *more* perfect ideas of space than our own.

Even if, furthermore, it must be true that all things in the universe are in interaction, and everything hangs immutably together according to fixed laws, yet Schiller's poetic saying, 'Und in dem Heute wandelt schon das Morgen,' would be, in the strictest sense of the word, a metaphysical truth, and it must be possible to conceive intelligences that apprehend *simultaneously* what to us stands as a succession in time. It is indeed certain that we can know nothing of all this, and that sound philosophy will only concern itself with such questions when it is important to refute the dogmatic assertion of the absolute objectivity of our ideas of space by the setting up of opposed possibilities. Kant is, at any rate, so far justified as the principle of intuition in space and time *a priori* is in us, and it was a service to all time that he should, in this first great example, show that what we possess *a priori*, just because it arises out of the disposition of our mind, beyond our experience has no longer any claim to validity.

As to Materialism, this treats time and space as it treats at bottom the whole sensible world, simply as objective. The deviations from this standpoint, such as we find, *e.g.*, in Moleschott, are deviations from the system of Material-

tual intuition, moreover, in another place plays a considerable part in the system: in the arbitrary assumption explained in note 25, that only our thought can be active, and our sense can be only passive. It may be said in passing, that we may find, too, in the passage of Kant above quoted, a very clear instance of a *problematical necessity*, a combination in which Professor Schilling, 'Beitr. zur Gesch. u. Kr. d. Mat.,' Leipz., 1867, found an "obvious logical contradiction," which may be just mentioned to show how heedlessly logic may be handled.

ism. Precisely with regard to space and time does Materialism feel safest as against Kant's criticism; for here we have not only the consciousness that we cannot imagine to ourselves an end of space and time, or an intuition entirely free of space and time, but even in the highest abstraction of thought, that entirely renounces an impossible picturableness, it will ever remain probable that, at most, there may exist among different physically organised beings, different degrees of the comprehension of space and time, but that these forms themselves, in their inmost nature, must belong to every possible conception, just because they are grounded in the nature of things. Kant, while he wished to accomplish more, has at least actually accomplished the lesser task. He established the doubt whether space and time have any meaning at all outside the experience of thinking, finite beings; and while he was far removed from leaving these limits and straying away with metaphysical speculations into the pathless beyond of 'absolute existence,' he has more effectually shattered the primitive *naïveté* of that belief in the senses which underlies Materialism, than any system of material Idealism could ever do. For while the latter serves up its ideas as reality and truth, the logical conscience of the sober thinker awakes, and we are then only too ready with the poetic phantasies of such speculation to reject also the reasons that are rightly alleged against the absolute reality of the sense-world as we represent it to ourselves.

As Kant, with regard to sensibility, established space and time as forms of intuition *a priori*, so in the sphere of reason he thought he had demonstrated the categories as the *a priori* given primary ideas. This demonstration, inadequate as it is, cost him much thought. By means of a single one of these ideas, the idea of causality, against which Hume had directed the solvent of his scepticism, Kant to a certain extent attained to his whole philosophy; and it was probably the supposed discovery of the complete table of the categories that decided Kant to appear

as the reformer of philosophy, after he had already gained no slight reputation as a philosopher of the Wolffian school, and especially as a thorough master of mathematics and natural science. Yet as to the inner history of this important change let us hear Kant's own words. The idea of causality has such especial import for the criticism of Materialism, that the most important section in the history of this idea may well deserve a place in the history of Materialism. In the preface to his Prolegomena,[30] Kant declares that since the origin of metaphysic, no event had come to pass that might have been more decisive of its fate than the attack of Hume, if only he had found a more receptive public. Then follows a long and extremely noteworthy passage, which we quote at length: "Hume started chiefly from a single but important concept in metaphysic—that of Cause and Effect (including the deduced notions of action and power). He calls on reason, which pretends to have generated this notion from itself, to answer him, with what right it thinks anything to be so constituted that, if granted, something else must necessarily be granted thereby; for this is the meaning of the concept of cause. He demonstrated irresistibly that it was perfectly impossible for reason to think such a combination by means of concepts and *a priori*—a combination that contains necessity. We cannot at all see why, in consequence of the existence of one thing, another must necessarily exist, or how the concept of such a combination can arise *a priori*. Hence he inferred that reason was altogether deluded by this concept, which it considered erroneously as one of its children, whereas in reality the concept was nothing but the bastard offspring of the imagination, impregnated by experience, and so bringing certain representations under the law of association. The subjective necessity, that is, the custom which so arises, is then substituted for an objective necessity from real

[30] Proleg. zu einer jeden zukünft. Metaphysik, Riga, 1783, S. 8–15, Hart. iv. 5–9, Mahaffy, iii. 4–10.

knowledge. Hence he inferred that the reason had no power to think such combinations, even generally, because its concepts would then be mere inventions, and all its pretended *a priori* cognitions nothing but common experiences marked with a false stamp. In plain language, there is not, and cannot be, any such thing as metaphysic at all.

"This conclusion, however hasty and mistaken, was at least founded upon investigation, and the investigation deserved to have suggested to the brighter spirits of his day a combined attempt at a happy solution of the problem proposed by him, if such solution were possible. Thus a complete reform of the science must have resulted.

"But the perpetual hard fate of metaphysic would not allow him to be understood. We cannot, without a certain sense of pain, consider how utterly his opponents, Reid, Oswald, Beattie, and even Priestley, missed the point of the problem. For while they were ever assuming as conceded what he doubted, and demonstrating with eagerness, and often with arrogance, what he never thought of disputing, they so overlooked his indication towards a better state of things, that everything remained undisturbed in its old condition.

"The question was not, whether the concept of cause was right, useful, and even indispensable, with regard to our knowledge of nature, for this Hume had never doubted. But the question to which Hume expected an answer was this, whether that concept could be thought by the reason *a priori*, and whether it consequently possessed an inner truth, independently of all experience, and therefore applied more widely than to the mere objects of experience. It was surely a question concerning the *origin*, not concerning the *indispensable use*, of the concept. Had the former question been determined, the conditions of the use and valid application of the concept would have been given *ipso facto*.

"But the opponents of the great thinker should have

probed very deeply into the nature of the reason, so far as it concerns pure thinking, if they would satisfy the conditions of the problem—a task which did not suit them. They therefore discovered a more convenient means of putting on a bold face without any proper insight into the question, by appealing to the *common sense of mankind.* It is indeed a great gift of God to possess right or (as they now call it) plain common sense. But this common sense must be shown practically, by well-considered and reasonable thoughts and words, not by appealing to it as an oracle when you can advance nothing rational in justification of yourself. To appeal to common sense when insight and science fail, and no sooner, this is one of the subtile discoveries of modern times, by means of which the most vapid babbler can safely enter the lists with the most thoroughgoing thinker, and hold his own. But as long as a particle of insight remains, no one would think of having recourse to this subterfuge. For what is it but an appeal to the opinion of the multitude, of whose applause the philosopher is ashamed, while the popular and superficial man glories and confides in it? I should think Hume might fairly have laid as much claim to sound sense as Beattie, and besides to a critical understanding (such as the latter did not possess), which keeps common sense within such bounds as to prevent it from speculating, or, if it does speculate, keeps it from wishing to decide when it cannot satisfy itself concerning its own principles. By this means alone can common sense remain sound sense. Chisels and hammers may suffice to work a piece of wood, but for steel-engraving we require a special instrument. Thus common sense and speculative understanding are each serviceable in their own way, the former in judgments which apply immediately to experience, the latter when we judge universally from mere concepts, as in metaphysic, where that which calls itself (often *per antiphrasin*) sound common sense has no right to judge at all.

"I honestly confess the suggestion of David Hume was

the very thing which, many years ago, first interrupted my dogmatic slumber, and gave my investigations in the field of speculative philosophy quite a new direction. I was far from following him in all his conclusions, which only resulted from his regarding, not the whole of his problem, but a part, which by itself can give us no information. If we start from a well-founded, but undeveloped, thought, which another has bequeathed to us, we may well hope, by continued reflection, to advance farther than the acute man to whom we owe the first spark of light.

"I therefore first tried whether Hume's objection could not be put into a general form, and soon found that the concept of the connection of cause and effect was by no means the only one by which the understanding thinks the connection of things *a priori*, but rather that metaphysic consists altogether of such connections. I sought to make certain of their number, and when I had succeeded in this to my expectation, by starting from a single principle, I proceeded to the deduction of these concepts, which I was now certain were not deduced from experience, as Hume had apprehended, but sprang from the pure understanding. This deduction, which seemed impossible to my acute predecessor, which had never even occurred to any one else, though they were all using the concepts unsuspiciously without questioning the basis of their objective validity,—this deduction was the most difficult task ever undertaken in aid of metaphysic. More especially no existing metaphysic could assist me in the least, because this deduction must prove the very possibility of metaphysic. But as soon as I had succeeded in solving Hume's problem, not merely in a particular case, but with respect to the whole faculty of pure reason, I could proceed safely, though slowly, to determine the whole sphere of pure reason completely and from general principles, in its limits as well as in its contents. This was what metaphysic required in order to construct its system safely."

In these words of Kant we have before us, in a single view, the influence of Hume upon German philosophy, the development of the table of Categories, and with it of the whole Critick of Reason, the true root-idea, and the explanation of all the errors of our Reformer of philosophy. This latter lies open before us in the confusion of the methodical and scientific handling of the laws of thought with so-called speculation that deduces from general conceptions.

The illustration of the engraving tool is better than its application. It is not a completely different starting-point of thought and an opposite method that guarantee its success to philosophical criticism, but solely and simply greater accuracy and precision in the handling of the general laws of thought. Metaphysic as *criticism of ideas* must go to work still more carefully and precisely than the philological criticism of a traditional text, than the historical criticism of the sources of a narrative, than the mathematical and physical criticism of an hypothesis in natural science; but essentially it must, like all criticism, work with every implement of the whole of logic, now inductive, now deductive, and must give to experience what belongs to experience, and to ideas what belongs to ideas.

And the error of the disciples of common sense by no means lies in a one-sided departure from experience. It would be nearer the truth if we were to understand the German phrase, 'Gesunder Menschenverstand' (sound common sense), rather on the analogy of 'cotton-stocking manufacturer,' and similar elegant formations. For it means, in fact, if not etymologically, the average understanding of a sound man, *i.e.*, of a man who, along with a crude logic, applies still sound senses, who in his judgments besides understanding allows play to feeling, intuition, experience, knowledge of facts, in an irregular way, so that in matters of daily life within the limits of common interests the result is a good and never eccentric judgment.

The logic of daily life is therefore successful, although it swallows camels and never strains out gnats. The influence of universal prejudice upon its results the great public does not detect, because it is all involved in the same errors. And thus sound common sense celebrates most of its triumphs in such achievements as the contempt of all efforts at reform, the defence of police guardianship, of a cruel criminal law, of the keeping under of the 'common people,' of the necessity of mechanical institutions, and the advantages of Gotham over all other towns of Europe. We learn to know it from a better side, however, where prejudice loses its influence, but where judgment, according to the subject-matter, must co-operate with reality and experience. Even the successes of Bentley in the criticism of Horace, of Niebuhr in the reform of Roman history, of Winckelmann in the spreading of a deeper comprehension of antiquity, of Humboldt in the sure casting of the world-reaching nets of general investigation, rest in great part upon a combination of the radical scientific understanding with a greater knowledge of men and of the world, or with a more vigorous reality, than commonly belong to the arm-chair student; and even in philosophical criticism this element becomes only relatively less important, without ever entirely losing its significance. It contributes to the achievement of the best work, so far as it serves and completes conscientious workmanship, while it fosters and develops every kind of vanity in the opposition against scientific thought. Kant felt this keenly in comparing so superior a mind as Hume with the representatives of common sense; but he confused greater power and keenness of thought with speculative method. It was nothing but force of logic by which Hume woke him from his dogmatic slumber; if Kant had merely reacted against the attack of Hume by the discovery of the Categories his reaction would not have been justified; but behind this luxuriant foliage of speculation lurks the profounder idea that might make him the Reformer of philosophy. It is the view that

man's experience is a product of certain fundamental ideas, the whole import of which lies in this fact, that they do determine experience. The controversy as to the idea of cause is understood generally. Hume is right in annihilating the supernatural, as it were revealed, origin of these ideas; he is wrong in that he deduces them from experience, since we are quite incapable of experience at all without being from the first so organised as to combine subject and predicate, cause and effect.

Strictly speaking, it is of course not the ideas themselves that exist prior to experience, but only those dispositions by which the impressions of the outward world are combined and arranged in accordance with these ideas. We might say, the body is *a priori*, if only the body itself in its turn were not merely an *a priori* given mode of conceiving purely intellectual phenomena. (Comp. note 25.) Perhaps some day the basis of the idea of cause may be found in the mechanism of reflex action and sympathetic excitation; we should then have translated Kant's pure reason into physiology, and so made it more easily conceivable. But the question essentially continues the same; for when once simple faith in the reality of the phenomenal world is expelled, the step from the physical to the intellectual is no longer a great one; only that, of course, the purely intellectual element will always remain unknown, just because we can only conceive it in sensuous images.

As the judgment of the idea of causality has become so far-reaching in its importance, we will not neglect to give here, in four short propositions, a summary view of the different doctrines as to this idea, including our own.

I. The old Metaphysic: The idea of cause springs, not from experience, but from the pure reason, and is, thanks to this higher origin, valid and applicable even beyond the limits of human experience.

II. Hume: The idea of cause cannot be derived from the pure reason, but rather springs from experience. The

limits of its application are doubtful, but at all events it cannot be applied to anything that transcends our experience.

III. Kant: The idea of cause is a primary idea of the pure reason, and as such underlies our whole experience. For this reason, therefore, it has unlimited validity in the sphere of experience, but beyond it has no meaning.

IV. The writer: The idea of cause is rooted in our organisation, and is, in point of the disposition to it, before all experience. For this very reason it has unlimited validity in the sphere of experience, but beyond it absolutely no meaning.

To the sphere of experience belongs also all that is inferred from immediate experience, and in general whatever is conceived on the analogy of experience; thus, *e.g.*, the doctrine of Atoms.[31] Epikuros, however, without any reason, assumed for his atoms a deviation from the straight line, a view that Kant, usually so moderate, at once disposes of as 'monstrous.'[32] He would surely never have allowed himself to dream that, after more than half a century, a countryman and intellectual relative of the great Hume would write down the following sentence:—

"I am convinced that any one accustomed to abstraction and analysis, who will fairly exert his faculties for the purpose, will, when his imagination has once learnt to entertain the notion, find no difficulty in conceiving that

[31] As appears from the context the 'sphere of experience' is only spoken of in that sense in which alone an entire disjunction exists between the transcendental and the empirical, between the spheres of 'phenomena' and 'noümena.' That this quite agrees with Kant's use must be at once obvious to every one who knows Kant's writings. Nevertheless, I have been obliged in my 'Neue Beitr. zur Gesch. d. Mat.' (Winterthür, 1867), S. 31–36, to produce an elaborate proof of this, and I will not deny that the bitterness with which I have replied to the pedantries of the since deceased Professor Schilling was provoked by nothing so much as his conspicuous ignorance of Kant in this point. If I had already witnessed the controversy between Kuno Fischer and Trendelenburg, I should assuredly have judged Schilling more gently.

[32] In the preface to the 'Allgem. Naturgesch. u. Theorie des Himmels' (1755): "Epikur war gar so unverschämt, dass er verlangte, die Atomen wichen von ihrer Bewegung ohne alle Ursache ab, um einander begegnen zu können" (Hartenst., i. 217).

in some one, for instance, of the many firmaments into which sidereal astronomy now divides the universe, events may succeed one another at random, without any fixed law; nor can anything in our experience or in our mental nature constitute a sufficient, or indeed any, reason for believing that this is nowhere the case." [33]

Mill regards belief in causality as a mere consequence of involuntary induction. From this it necessarily follows that upon our earth, just as well as in the remotest firmaments, something might happen without any cause; and Epikuros, who was only untrue to the law of cause in that one instance, might with all reason answer Mill in his favourite formula: "Then anything might come from anything!" 'Quite true, indeed,' Mill will answer, 'only it is not at all *probable;* we'll talk about it again, so soon as such a case occurs.' And if then a case occurs that seems to contradict all the previous notions of science, Mill will just like us, who hold the idea of cause as given *a priori,* suspend his judgment on this case until science has studied it more exactly. He will always be able to maintain that he has so much regard for induction, that he cannot yet surrender the hope of ranging this case under the universal law of cause. The proof of the contrary will be a suit *in infinitum;* the matter threatens to run into an empty logomachy, if it is not conceded that the adherents to the *a priority* of the causal law are right *a priori* and before experience. Mill would perhaps not have erred so far, if he had distinguished between the law of cause in general and the conception of it in our modern physical science. This latter conception, according to which all causes and effects stand in the strictest connexion of natural laws, and outside these no thing or idea is allowed any causal significance,—this particular scientific conception of the law of cause is indeed new, and has been acquired by induction within historical times. The necessity proceeding immediately from the nature of the human mind to

[33] Mill, Logic, 6th ed., ii. 98.

assume a cause for everything, is, in fact, often very unscientific. It is due to the idea of cause that the monkey —in this respect, as it seems, humanly organised—gropes with its paw behind the mirror, or turns the mocking thing round, in order to seek the cause of the phenomenon. It is due to the law of cause that the savage attributes the thunder to the car of a god, or at an eclipse imagines that a dragon is trying to swallow up the light-giver. The law of cause makes the babe associate the appearance of its mother with its own cry, and so gives rise to experience. The privileged noodle, however, who attributes everything to chance, thinks of chance—if he thinks at all—as a demonic thing whose malice contains a sufficient explanation of all his failures.[34]

Our modern Materialists will as to this question, perhaps, be a little inconsistent with themselves. Inclined, on the one hand, to draw everything from experience, they will not like to make an exception in the case of the law of cause. On the other hand, the unconditional and unlimited validity of the natural laws is rightly one of their favourite principles. Czolbe, indeed, seems to range himself quite decidedly * on Mill's side; but by innate laws of thought he understands such as from our birth lie as logical principles in our consciousness. In

[34] It is, of course, quite another question whether the law of cause must not ultimately be brought into so purified a shape, that the anthropomorphic ideas that we associate with the notion of Cause, as with that of Necessity, of Power, and so on, may entirely vanish, or at all events be reduced to a harmless minimum. In this sense, indeed, even the category of causality can lay claim to no sanctity, and if, *e.g.*, Comte entirely dismisses the notion of cause, and replaces it by the notion of invariable sequence, this procedure can by no means be impugned on the ground of the *a priority* of the notion of cause. Even in this an indispensable factor may be separated from the ingredients furnished by imagination, and the more intellectual culture advances, the more such will a purification (as, *e.g.*, even in the notion of *power*) be felt to be needed. As to causality it is in truth, as will later appear, of the utmost importance, once for all, to displace at least one of the anthropomorphic ideas mixed up with it; that which attributes to the cause (the *Ur-sache*), as though it were the active, generative element, higher consequence and importance than to the effect.

* Sensualismus, S. 64.

which way he would have decided after this misunderstanding has been removed cannot be quite clearly determined from his statement. At all events, in his postulate that our ideas must be such as are clearly conceivable, Czolbe has set up a metaphysical principle which it is quite impossible to harmonise with Mill's system, and which carries us even beyond Kant in the other direction. With Büchner we find the necessity and invariableness of natural laws most strongly emphasised, and yet the belief in these laws is derived from experience. At the same time, even Oersted's metaphysical principle of the unity of the laws of thought and the laws of nature is occasionally treated as true.

Perhaps many of our modern Materialists would be inclined to elevate this uncertainty of which we are speaking into a principle, and to declare the whole distinction between the empirical and the rational conception of the notion of cause to be useless refinement. This is, of course, to give up the ground, for it is obvious that for the practical application of the notion of cause it is sufficient to draw it from experience. More exact investigation can have no object except in a purely theoretical interest; where we have to do with ideas keenness of logic is as indispensable as exact analysis in chemistry.

The most favourable position for our modern Materialists would be for them, on the whole, to go with Hume and Mill, and to avoid the fatal consequences of a possible exception to the law of causality by insisting upon the infinitely slender probability of such an exception. This is, at all events, sufficient to dispose of the lovers of miracle, for we may always require, as though it were demanded by the *morality of thought*, that our assumptions should rest, not upon vague possibility, but upon probability. This does not, however, dispose of the real question; for the true difficulty lies in this, that from the outset two sensations could never be combined into an experience of their connexion, unless the ground of their interdependence as

cause and effect were determined by the disposition of our mind.

From this point, indeed, there falls quite a new light upon the relation of the phenomena to the 'thing-in-itself.' If the idea of causality is a category in Kant's sense, then, like all the categories, it has validity merely in the sphere of experience. Only in combination with the intuitions that sense supplies can these ideas be referred to an object. Sensibility realises the understanding. But how, then, is it possible, if this is so, to conclude to a 'thing-in-itself' that stands behind the phenomena? Does not the idea of cause then become transcendental? Is it not applied to a supposed hypothetical object that lies beyond any possible experience?

This objection has, from the first replies to the 'Critick' down to the present, always been supposed a fatal blow to Kant; and even we ourselves, in the first edition of this work, assumed that the 'armour of the system' is thereby crushed in. A more careful inquiry, however, shows that this blow does not find Kant unprepared. What we announced as a correction of the system is, in fact, exactly Kant's own view; the 'thing-in-itself' is a mere idea of limit. 'The fish in the pond,' we remarked, 'can swim only in the water, not in the earth; but yet it may strike its head against the ground and sides.' So, too, we might with the notion of cause survey the whole realm of experience and find that beyond it lies a sphere which to our knowledge is absolutely inaccessible.[35]

[35] The change in my views on this point had already been prepared by my new studies, when the important work of Dr. Cohen on Kant's 'Theorie der Erfahrung' appeared, which led me to another entire revision of my views on Kant's system. The result was that I was obliged on most points to adhere to Dr. Cohen's interpretation, so far as the objective exposition of Kant's views was concerned, always with the reservation that Kant still seems to me far from being so free from inconsistencies and hesitations, as appears from Dr. Cohen. We have now the beginnings of a 'Philology of Kant' that will probably soon find imitation, and it is quite natural that this, like the Aristotle-philology of the school of Trendelenburg, has its principal motive in trying to conceive the object of its studies as a consistent whole. The points in which this is impossible will

We do not, then, really know whether a thing-in-itself exists. We know only that the logical application of our laws of thought leads us to the notion of an entirely problematical something which we assume as the cause of the phenomenon so soon as we have recognised that our world can only be a world of representation. If it is asked, But where, then, are things? the answer runs, In the phenomena. The more the 'thing-in-itself' refines itself away to a mere representation, the more the word phenomena gains in reality. It embraces everything that we can call 'real.' The phenomena are what the ordinary understanding calls things; the philosopher calls the things phenomena, in order to denote that they are not something existing entirely outside myself, but a product of the laws of my understanding and my sensibility. The same laws lead me, then, on the analogy of the relations of cause and effect, as I daily observe them in the individual facts of experience, to suppose a cause for this great whole of the world that appears to me. Empirical investigation in the hand of the notion of causality showed us that the world of the ear does not correspond to the world of the eye, that the world of logical inferences is other than that of immediate intuition. It shows us that the whole of our world of appearances depends upon our organs, and Kant has the lasting credit of having shown that here our categories play the same part as our senses. If now the comprehensive view of the world of appearances leads us to the idea that this, too, in its collective relations is conditioned by our organisation, we must, driven by analogy, suppose that even where we can acquire no new organ to supplement and improve the others, still a whole infinity of different interpretations is possible; nay, that in fine all these different views of differently organised beings have a common unknown source as their origin, the thing-in-

thus be most certainly revealed. The important passages for the interpretation of the thing-in-itself here laid down are especially in the sections on Phanomena u. Noümena, and on the Amphibolie der Reflexionsbegriffe.—Cp. besides, Cohen, K. Th. d. E., S. 252 f.

itself as opposed to the things of appearance; then we quietly yield to this view, so far as it is a necessary consequence of the use of our understanding, even though the same understanding, upon further investigation, must confess that it has itself created this antithesis. We find everywhere nothing but the usual empirical opposition between appearances and existence, which, of course, exhibits endless degrees to the reason. What at this stage of consideration is existence, appears again at another, in relation to a deeper concealed existence, as appearance. The true essence of things, the last cause of all phenomena, is, however, not only unknown to us, but even the idea of it is nothing more and nothing less than the last outcome of an antithesis determined by our organisation, and of which we do not know whether, beyond our experience, it has any meaning at all.

Kant denies that the question as to the nature of things in themselves has any interest: so entirely is he in harmony here with the empiricist who, to use an expression of Czolbe's, contents himself with the given world. "What things may be in themselves," he says in the section on the *Amphibolie der Reflexionsbegriffe*, "I know not, and do not need to know, because a thing is never presented to me otherwise than as a phenomenon;" and, further, he declares the "internal in matter," or the thing-in-itself which appears as matter, to be "a mere chimera." The complaints that we do not see into the interior of things—with a clear allusion to that saying of Haller's that was so distasteful to Goethe—are "silly and unreasonable;" for such people desire that we should be able to know things and even to perceive them without senses. But "into the interior of nature," that is the orderly relations of phenomena, "penetrate observation and analysis of phenomena, and no one can say what progress this knowledge may make in time." [36]

[36] The well-known verses:

"In's Inn're der Natur
Dringt kein erschaffner Geist;
Glückselig! wem sie nur
Die äuss're Schale weist!"

over which Goethe (Gedichte, Abth.

As it is with the notion of causality, so it is also with the rest of the Categories; they underlie our whole experience, but are entirely useless for the purpose of overstepping the province of possible experience, and of being applied to those transcendental objects, to secure a knowledge of which was the aim of the old metaphysic. That Kant created a new metaphysic, in thinking that he could with certainty deduce all the *a priori* elements of our thought from a single principle, is the weak side of his theoretical philosophy. Though it was nevertheless precisely this supposed discovery that led him to appear as the reformer of philosophy, we must not forget that hardly any one resists the fascination of such brilliant conjectures, and, what is more important, that even here there is an underlying core of truth.

Kant believed, that is to say, that he could deduce the primitive conceptions of the understanding from the different forms of the judgment, as they are or should be taught in logic. If, then, we were sure that we knew the real and permanent primary forms of judgment, it would not be illogical to conclude from these to the true fundamental conceptions, as it must be supposed that the same qualities of our organism which determine our whole experience give their stamp also to the various tendencies of the activity of our understanding.[37] But whence are we to

Gott u. Welt: 'Allerdings. Dem Physiker') for sixty years 'cursed in secret,' are to be understood in the sense of Leibniz's philosophy, according to which all sensuous intuition, and therefore also our whole view of nature, is only the confused representation of a divine pure thought (or intellectual, not sensuous, intuition). According to Kant, the interior of nature in the sense of the transcendental basis of phenomena is indeed inaccessible to us, but we are also not at all concerned to inquire into it, while the interior of nature in the sense of natural science is open to an unlimited progress of knowledge.

[37] Cp. *supra* note 25. With reference to Cohen, Kant's The. der Erfahr., S. 207, let me here add further that it is not enough to defend Kant by saying that his *system* continues to exist, though individual categories must fall away or be otherwise deduced. It is quite true that the system rests upon the transcendental deduction of the categories, and not upon the metaphysical—that is, that the true proof of Kant lies in this, that these ideas are demonstrated

learn the simple and necessary elements of all judgment, for only these are able to supply us with true categories?

The "deduction from a principle," altogether a most seductive procedure, consisted, however, at bottom only in this, that five perpendicular and four transverse lines were made, and the twelve compartments thus formed were filled up; though it is quite obvious, *e.g.*, that of the judgments of Possibility and Necessity, at most only one can be an original form, from which the other is produced by the use of negation. In this respect the purely empirical procedure of Aristotle was essentially better, because at least it did not lead to such dangerous self-delusions. The error which Kant fell into was indeed for a disciple of the German scholastic philosophy, which only slowly with immense effort of mind had torn itself from tradition, very natural. Kant over-estimated the value of the work he supposed formal logic to have accomplished by way of preparation, just as he also over-estimated the table-work of empirical psychology—at least as to its applicability

a priori as conditions of the possibility of synthetic knowledge. We might then suppose that it is indifferent whether such a fundamental idea is set aside by a more exact analysis, so long as that *persistent factor* in it (cp. also note 34) is retained, which underlies the synthesis *a priori*. But here we must observe that this analysis, going beyond Kant, will very probably lead at the same time to a reduction (perhaps to a completion) of the table of Categories, and that thus of course a pretension of Kant's, which is very important for the developing of his system (viz., absolute completeness of his table of Categories), would be destroyed. If we push too far the emphasis on the *merely transcendental* standpoint, we come, as already hinted, to the tautology, that experience is to be explained out of the conditions of possible experience in general. If transcendental deduction is to afford a synthetic result instead of this tautology, the categories must necessarily be something more besides being conditions of experience. This with Kant is to be sought in their designation as "primitive conceptions of the pure reason," while we have here substituted 'Organisation' instead. For this very reason, however, Kant's aim must be to discover the ultimate and permanent "primitive conceptions," and not any casual network of anthropomorphically tinctured conceptions, of which it cannot even be said whether one or several of them correspond to the ultimate, logically indispensable, primitive conceptions. Let me observe still further on this occasion that we cannot only, as Comte has shown, dispense with the conception of 'cause,' but that the conception of 'possibility' and 'necessity' in particular, as we hope to show later, may be entirely dismissed from philosophical employment.

for a complete classification of the mental activities. He did not reflect that in the traditional logic, owing to its natural connexion with grammar and language, there still linger psychological elements, which in their anthropomorphic constitution are very different from the strictly logical element in logic, which indeed is even yet awaiting a rigid purification from these admixtures. At the same time, however, in taking the division of judgments not unaltered from the scholastic logic, but filling up his dozen by many reflections of very various value, he followed unmistakably that architectonic instinct of the metaphysician, which has its place in the creations of speculation, but not in a critical investigation of the foundations of the understanding. The further, therefore, he ventured in applying his four main heads of quantity, quality, relation, and modality with the trichotomy of their subdivisions, the more he lost the safe ground of criticism from beneath his feet,[38] and reached that dangerous province of creation out of nothing into which his successors soon strike out with full sails, as though they were about to conquer a world, while really they were only going to wander fruitlessly on what Kant has so rightly called that "wide and stormy ocean, the true home of mirage."

It would lead us too far to enter here upon a special criticism of the table of Categories. It is more important for the subject of Materialism, instead of dealing with the other Categories, to look further into the origin of those *ideas* which constitute the core of the whole controversy. If we will believe Schleiden, Kant has for ever impregnably established the ideas of God, Freedom, and Immortality. Instead of this we find in the sphere of theoretical philo-

[38] It must here be expressly observed that this applies, not only to the often untenable constructions in the 'Critick of Practical Reason,' but that the evil appears very plainly even in the 'Systematische Vorstellung aller Grundsätze' (to say nothing of the 'Metaphysische Anfangsgründe'), so that if any one wished to support the twelve Categories *from this point*, a serious criticism would assuredly not result in favour of the 'deduction from a principle.'

sophy especially only a deduction that is, if possible, even more doubtful than that of the Categories. While Kant deduced these from the forms of judgment of the usual logic, he found himself obliged—it is hard to say why—to deduce these ideas as pure conceptions of the reason from the forms of syllogisms. Here again he believed that he had thus found a guarantee for the complete securing of the ideas of pure reason, and very ingeniously developed out of the categorical syllogism the idea of the Soul, out of the hypothetical the idea of the World, and out of the disjunctive the idea of God.

The Categories, according to Kant, serve only for the use of the understanding in experience. What purpose, then, do the ideas serve? Considering the important part that these ideas play in the materialistic controversy of our days, it will not be uninteresting to hear a few words more from Kant on this very point. However little value we may attribute to the deduction of these ideas of the reason, all the more must we admire, in criticising the part they play in our knowledge, the admirable clearness of a great intellectual leader.

Kant observes in the *Prolegomena* (§ 44), "That the idea of reason is not, like the Categories, of any service to the use of our understanding in experience, but with respect to that use is quite dispensable, and even an impediment to the maxims of the rational cognition of nature, though necessary in another respect still to be determined.

"Whether the soul is or is not a simple substance is of no consequence to us in the explanation of its phenomena; for we cannot render the notion of a simple being intelligible by any possible experience, sensuously or *in concreto*. The notion is, therefore, quite void as regards all hoped-for insight into the cause of phenomena, and cannot at all serve as a principle of the explanation of that which internal or external experience supplies. So the cosmological ideas of the beginning of the world or of its eternity cannot be of any greater service to us for the explanation

of any event in the world itself. And, finally, we must, according to a right maxim of the philosophy of nature, refrain from all explanations of the design of nature drawn from the will of a Supreme Being, because this is no longer natural philosophy, but an acknowledgment that we have reached its limits." *

More cannot be demanded by those of our modern 'Materialists' who have no wish at all to be metaphysicians, and whose only object is to clear the way everywhere for exact investigation, while it remains quite indifferent to them what may be supposed beyond this investigation on whatever grounds. The *dogmatic* Materialist, however, will ask, What then can these ideas do if they can exercise no influence whatever on the course of the positive sciences? He will not only suspect that they will after all sneak again by some back way into the sphere of inquiry, and oppose themselves to the progress of the sciences, but he will no longer recognise anything outside sensuous experience, since he maintains as a metaphysical dogma that the world is as it appears to us through our senses. This suspicion, let us observe, is only too well grounded; where, that is, we have to do with certain Kantians, and not with Kant himself. Has not the combination of bureaucratic fanaticism with philosophical impotence brought it about that Kant's doctrine of freedom was abused even in judicial psychology—a science that becomes the death-instrument of juristic pedantry so soon as it leaves the ground of the strictest empiricism? [39] As to the metaphysical dogma of the absolute objectivity of the sense-world, on the other hand, the ideas will be very easily able to maintain their own peculiar position.

Reason, the mother of these ideas, is in Kant's view directed to the sum of all possible experience, while the

* Mahaffy, iii. 120.

[39] Cp. my essay 'On the Principles of Legal Psychology, with special reference to Ideler's Lehrbuch der jur. Psych.' in the Deutsche Zeitschr. für Staatsarzneikunde, Neue Folg., Bd. xi., Heft 1 and 2: Erlangen, 1858.

understanding occupies itself with the particular. Reason finds satisfaction in no amount of knowledge, so long as it has not embraced the whole. Thus the reason is systematic, just as the understanding is empirical. The ideas Soul, World, God are only the expression of those efforts after unity that lie in our rational organisation. If we attribute to them an objective existence outside ourselves, we fall at once into the shoreless sea of metaphysical errors. So long, however, as we hold them in honour as *our* ideas, we only satisfy an irresistible demand of our reason. These ideas do not serve to extend our knowledge, but they do serve to refute the assertions of Materialism, and thereby to make way for the moral philosophy which Kant holds to be the most important branch of philosophy.

What justifies the ideas as opposed to Materialism is then not their claim to a higher truth, whether it be demonstrated or whether it be revealed and indemonstrable, but precisely the opposite of this; the complete and absolute renunciation of any theoretical validity in the sphere of the knowledge that has for its object the external world. From figments of the brain the ideas are chiefly distinguished by the fact, that they do not crop up occasionally in an individual man, but that they are based in man's natural disposition,[40] and that they have a utility which does not belong to ordinary figments of the brain. Thus criticism is powerless against the ideas, while it sets aside all dogmatic metaphysic, and therefore dogmatic Materialism too. If the proof were conclusive that the ideas in the number and shape in which Kant deduces them were an absolutely necessary result of our natural

[40] 'Natural disposition of man' is more correct; 'natural disposition of the human mind,' as I wrote in the first edition, is more popular. It is not without interest to see how Kant, *e.g.*, in the introduction to the second edition, pt. vi., avoids the expression 'natural disposition of the mind,' or even 'of the soul,' precisely in order to prevent its appearing as though this 'disposition' is something different from the physical organisation. On the other hand, he talks quite unconcernedly of the nature or the impulses of the 'reason,' by which is understood only a function of man, without deciding as to the relation of body and soul. Comp. note 25.

disposition, they would thus have an inexpugnable right upon their side. If, furthermore, this natural disposition of ours be discovered by pure reason, without any experience, there would assuredly be in it an essential branch of knowledge. Let us imagine, to make this clear, a man who takes a kaleidoscope for a telescope. He supposes that he perceives extremely remarkable objects, and observes them very diligently. He must now be shut up in a narrow room. On one side it has a window, affording him a narrowed and disturbed view outwards; on another side the tube, with which he supposes that he sees afar, is fastened in the wall. This outlook he is specially fond of. It charms him more than the window; assiduously he seeks in this way to perfect his knowledge of the wonders in the distance. This is the metaphysician who despises the narrow window of experience, and lets himself be deceived by the kaleidoscope of his ideal world. But if now he observes this deception, if he proves the nature of the kaleidoscope, it may still even be for him, despite the cruel disenchantment, an object of interest and knowledge. He asks no longer, What is the meaning of the wonderful pictures that I see there in the distance? but, What is the constitution of the tube that gives rise to them? So there might lie in this a source of knowledge that might be just as important as the outlook from the window.

Our readers will already observe that here there remains the same doubt that we asserted against the categories. It must be admitted that such a disposition may exist in our reason, as necessarily presents to us ideas which have nothing to do with experience. It must be admitted that such ideas, if we have freed ourselves from the deceptive appearance of an external knowledge, may still be, even in a theoretical sense, an extremely valuable intellectual possession; but we have no means of deducing them with certainty from a principle. We find ourselves here simply on the ground of *psychology*—so far that is as such a science may be spoken of as already existing—and only the uni-

versal method of special scientific inquiries can lead us to a knowledge of such natural dispositions, if such knowledge be possible at all.[41]

But now as to the *necessity* of the ideas, it must, in the extent in which Kant maintains it, be decidedly controverted. Only for the idea of the soul, as a unitary subject for the multeity of sensations, may it be said to be probable. As to the idea of God, so far as a rational Creator is opposed to the world, there is no such natural disposition. This is proved not only by the Materialists through their mere existence; it is proved also by many of the greatest thinkers of ancient and modern times, Demokritos, Heraklitos, Empedokles, Spinoza, Fichte, Hegel. Far as these last two on the main question — like the astronomer Tycho—have fallen behind Kant, yet they serve here as examples of vigorous thinkers, with a leaning to the abstract, who by no means confirm the ideal of the pure reason of a rational originator of the universe in Kant's sense.

While treating the idea of the world as a totality of all phenomena in their causal connexion, Kant tries to solve also the problem of the will. But this very problem plays a great part in the materialistic controversy of our day; and while the Materialists usually confine themselves to a simple denial of free will, unskilful opponents appeal often enough to Kant, as though he had proved incontrovertibly the existence of free will. From either point of view, then, it must throw light upon the matter, if we succeed in sketching Kant's real view, with a few firm and comprehensive traits.

In the phenomenal world, everything hangs together as

[41] That psychology, in the sense in which alone it can in future be called a science, must start not from a notion of a soul, but from the psychical functions, we shall show further on. The relation of 'body and soul' in the sense of the old metaphysic, need, therefore, by no means be decided in the materialistic sense. It is simply beyond discussion, as something to which actual investigation within the limits of possible experience never leads. See previous note.

cause and effect. To this the human will is no exception. It is entirely subject to the law of nature. But this law of nature itself, with the whole succession of events, is only phenomenon, and the natural disposition of our reason necessarily leads us to assume besides the world that we perceive with our senses another imaginary world. This imaginary world, so far as we form any definite idea of it, is a world of illusion, a figment of the brain. So far, however, as we regard it merely as the general notion of the nature of things that lies beyond our experience, it is something more; for precisely because we recognise the phenomenal world as a product of our organisation, we must also be able to assume a world independent of our forms of knowledge—the 'intelligible' world. This assumption is not a transcendental knowledge, but merely the ultimate consequence of the use of the understanding in judging of what is given us.

Into this intellectual world Kant removes the freedom of the will, that is, he abolishes it altogether from the world that we usually call the real world—from our phenomenal world. In this latter everything is related as cause and effect. These alone can, leaving the criticism of the reason and metaphysic out of view, be the object of scientific inquiry; they alone can form the basis of a judgment on human actions in daily life, in medical or judicial investigations, and so on.

We must judge quite otherwise in the sphere of practice, in the struggle with our own passions, in education, or wherever we are concerned not to judge as to the will, but to exercise a moral effect. There we must start from the fact, that we find within ourselves a law that unconditionally prescribes to us how we ought to act. This law, however, must be associated with the conception that it can also be carried into effect. 'Thou canst, for thou oughtst,' says the inner voice; not, 'Thou oughtst, because thou canst;' because the sense of duty is present quite independently of our power. Whether Kant was justified

in basing his whole practical philosophy on the idea of *duty* we leave for the present undetermined. We simply insist upon the fact. Considering the enormous influence which Kant, understood or misunderstood, has exercised upon the treatment of these questions, we spare ourselves and our readers endless discussions as to modern controversies, if we only succeed in clearly and fully exhibiting the essential course of Kant's ideas, without losing ourselves in the labyrinth of these endless definitions of his, which remind us of Gothic ornamentation.

Quite independently of all experience Kant believes that he can find in the human consciousness the moral law, which as an inner voice commands absolutely, but is, of course, not absolutely obeyed. But just because man conceives the unconditional fulfilling of the moral law as possible, a conditional influence also is exercised upon its real, and not its merely imaginary, accomplishment. The conception of the moral law we can only regard as an element of the mental process as matter of experience, which has to struggle with all other elements, with impulses, inclinations, habits, momentary influences, and so on. And this struggle, together with its result—the moral or immoral act—follows in its whole course the universal natural laws to which man in this respect forms no exception. The conception of the unconditional has, therefore, in experience only conditional force; but yet this conditional force is all the stronger, the more purely, clearly, and strongly the man can hear within himself that unconditionally commanding voice. But the conception of duty which calls to us, 'Thou shalt,' cannot possibly continue clear and strong, if it is not combined with the conception of the possibility of carrying out this command. For this reason, therefore, we must, with regard to the morality of our conduct, transfer ourselves entirely into the intellectual world in which alone freedom is conceivable.[42]

[42] In the First Ed. we were content to set out this side of the Kantian doctrine of freedom, thinking that it contains, at least from a theoretical

So far Kant's doctrine of freedom is perfectly clear and —apart from the question of the *a priority* of the moral law—invulnerable. He still wants, however, a bond which shall give greater certainty to the doctrine of freedom, while at the same time it binds together the practical and the theoretical philosophy. In establishing this bond, Kant gives to his doctrine of freedom a mystic background, which seems desirable for the moral impulse of the soul, but which at the same time seriously confuses that clear and definite doctrine of the relation of the world of phenomena to the world of things-in-themselves, which we have set out above, and lands the whole system in uncertainty.

This bond is the idea that, in order to be able to support *practically* the doctrine of freedom, we must *theoretically* assume it as at least possible, although we cannot know in what way it is possible.

This postulated possibility is built upon the notion of things in themselves as opposed to phenomena. If the phenomena were the things in themselves, as Materialism maintains, freedom could not be saved. The bare idea of freedom is not enough for him, unless it is related to the phenomena exactly as is an idea to reality, or poetry to history. Nay indeed, Kant goes so far as to say, "Man

standpoint, the kernel of the question, and that passages like those from the *Kritik d. pr. V.* (Hart., v. S. 105), which are discussed further on, might be regarded as deviations from the essential principle, while the whole doctrine of the "objective reality" of the idea of freedom only serves to darken the real question. The present fuller exposition is connected with my renouncing the attempt to be so very popular and easy, but will, I hope, be intelligible to that class of readers who are most interested in a scientific history of Materialism. An important point is, that even this mystical character which the doctrine of freedom acquires in passing over into the sphere of practice does not exclude the strict rule of the laws of nature in empirical psychology, and that therefore even in this sphere Kant's "transcendental freedom" is very different from that theory of freedom which Schleiden, Ideler, and other 'Kantians' have read into him. The proofs of our several propositions which attempt to give shortly, for the most part, the sense and spirit, and not the words, of the Kantian theory, must be here dispensed with, as the notes would otherwise, with any pretensions to thoroughness, have extended themselves into a book.

would be a marionette or a Vaucanson's automaton put together and set agoing by the supreme master of mechanism," and the consciousness of freedom would be mere delusion, unless the actions of man were "mere determinations of man as phenomenon."

It must be observed that Kant, even after this hazardous step, still remains at peace with the scientific study of man. The world of phenomena, to which man belongs as a portion of them, is thoroughly governed by the law of cause; and there is no action of man, not even the supreme heroism of duty, which is not, physiologically and psychologically considered, determined by the antecedent development of the individual, or by the shaping of the situation in which he finds himself placed. On the other hand, Kant holds the idea to be indispensable, that the very same series of events which in the world of phenomena presents itself as a causal series, is in the intelligible world based upon freedom. This idea appears theoretically as possible only, but the practical reason treats it as actual, nay, it converts it, through the irresistible force of the moral consciousness, into an assertory principle. We know that we are free, although we do not see how it can be so. We are free as rational beings. The subject exalts itself in the certainty of the moral law above the sphere of phenomena. We think of ourselves in moral action as a thing in itself, and we have a right to do so, although the theoretical reason cannot follow us here. There is nothing left her, as it were, but in the moment of action to marvel at the wonder, which she at the same time, in the moment of examination, must again find too easy, and cannot take up into the sure possession of knowledge.

This whole train of thought is wrong from the very outset. Kant wished to avoid the obvious contradiction between the Ideal and Life; but this is impossible. It is impossible because the subject, even in the moral struggle, is not noümenon but phenomenon. The corner-stone of the critical philosophy—that we do not know even our-

selves as we are in ourselves, but only as we appear to ourselves—can no more be overturned by the *moral* will than by the will in general, after the fashion of Schopenhauer. But even if we would suppose with Schopenhauer that the will is the thing in itself, or with Kant that in moral willing the subject is a rational thing, even this could not protect us from that contradiction; for we have to do in every moral struggle, not with the will in itself, but with our *conception* of ourselves and of our will, and this conception remains unavoidably phenomenon.

Kant, who in the Prolegomena explains his own view to be that truth lies only in experience, has by a stroke of the pen turned all experience into a game of marionettes; while, at the same time, the whole difference between an automaton and a morally acting man is undoubtedly *a difference between two phenomena.* In the phenomenal world those notions of value have their root, by which we find here mere mechanicalness and there exalted earnestness. We conceive the one and the other with our senses and ideas, and establish a distinction which is not in the least impaired by the circumstance that we find in both the common feature of necessity. But even if it were so impaired, yet here again the translation into the 'thing-in-itself' would not help us. To compare them, everything, and not only the moral will, must be transferred into the world of noümena, and what then becomes of the marionette? What of the mechanism of nature in general? There the difference in our estimation will perhaps disappear, which in the world of phenomena has its roots sure and independent of any psychological views as to the will.

All these objections, however, touch only the equivocal position into which by that fatal turning the thing in itself is brought, and the construction of a knowledge that is yet no knowledge, of a science which, according to our own presuppositions, cannot be called science. Kant would not understand, what Plato before him would not

understand, that the 'intelligible world' is a world of poesy, and that precisely upon this fact rests its worth and nobleness. For poesy, in the high and comprehensive sense in which it must be taken, cannot be regarded as a capricious playing of talent and fancy with empty imginations for amusement, but it is a necessary offspring of the soul, arising from the deepest life-roots of the race, and a complete counterbalance to the pessimism which springs from an exclusive acquaintance with reality.

It was not that Kant had no sense for this view of the intelligible world, but his whole development, and the age in which his intellectual life had its roots, prevented him from breaking fully out into the light in this point. As it was denied him to find for the powerful structure of his ideas a noble form, free from mediæval fancifulness, so his positive philosophy never attained a full and free development. His philosophy, however, stands with Janus-countenance on the border of two ages, and his relations to the great epoch of German poetry go far beyond the character of a casual and isolated stimulus. And therefore the false subtleties in his deduction of freedom may speedily be forgotten; the loftiness with which he conceived the idea of duty kindled a flame in youthful minds; and many a passage of his writings, in all the simplicity of their awkward expression, exercised an entrancing influence, as of a heroic song, upon those spirits that were seized by the ideal character of the age. "There is also a teacher of the ideal," said Kant towards the end of the *Critick*, and him alone must we call the philosopher. He himself, despite all errors in his deductions, has become such a "teacher of the ideal." Especially has Schiller, with a spiritual divination, seized the core of his doctrines and purified them from scholastic dross.

We shall hardly find a more eloquent testimony for the importance which we have here attributed to poesy than the fact that Schiller in his prose writings repeatedly shares, nay even surpasses, the faults of the Master, while

in his poetry he is thoroughly consistent. Kant believes that we can only 'think,' and not 'intuite,' the intelligible world, but that what we think about it must possess 'objective reality.' Schiller has, rightly enough, made the intelligible world visible to sense in treating it as a poet; and in so doing he has trodden in the steps of Plato, who, in contradiction to his own dialectic, produced his noblest creations when he made in the mythos the supersensuous become sensuous.

Schiller, the 'poet of freedom,' might venture openly to transpose freedom into the 'Realm of Dreams' and the 'Realm of Shadows,' for beneath his hand dreams and shadows were raised to the ideal. The wavering became a fixed pole, the fleeting a godlike form, the play of caprice an everlasting law, as over against life he set the ideal. Whatever of good religion and morality contain cannot be more purely and forcibly expressed than in that immortal Hymn which closes with the passage through the sky of the tortured Son of God. Here is embodied the flight from the limits of the senses into the intelligible world. We follow the God who, 'flaming, parts Himself from man,' and now dream and truth change their parts—the heavy dream-picture of life sinks, and sinks, and sinks.

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Later we shall come upon these thoughts again. Here let us only add, that the historical importance that Kant's ethic attained must seem to us, not only intelligible, but even justifiable, as soon as we regard it in the proper light. The lasting achievements of Kant's philosophy lie in the criticism of the pure reason, and even here only in a few fundamental principles; but a philosophy is not important only through those elements of it that stand the test of the understanding, and are numbered among the assured treasures of human knowledge. Creations of a bold and, as it were, unconsciously poetic combination, which a strict criticism must again destroy, may through

their spirit and content exercise a deeper and nobler influence than the most luminous doctrines; and human culture can no more spare the stimulating glow of these revelations, perishable though they be in form, than the illuminating light of criticism. No thought is so calculated to reconcile poesy and science as the thought that all our 'reality'—without any prejudice to its strict connexion, undisturbed by any caprice—is only *appearance*. Yet this truth still remains for science, that the 'thing-in-itself' is a mere limitative idea. Every attempt to turn its negative meaning into a positive one leads us undeniably into the sphere of poesy, and only what endures when measured by the standard of poetic purity and nobleness can claim to serve a generation as instruction in the ideal.

CHAPTER II.

PHILOSOPHICAL MATERIALISM SINCE KANT.

ENGLAND, France, and the Netherlands, the true homes of modern philosophy, retired towards the end of the last century from the theatre of metaphysical war. Since Hume England has produced no great philosopher, unless we concede this rank to the acute and energetic Mill. A similar interval lies in France between Diderot and Comte. In both countries we find meanwhile in other spheres progress and revolutions on the most splendid scale. Here the most unexampled movement of industry and commerce with general consolidation; there the Revolution that shook Europe, and the development of a tremendous military power. These were two very different, indeed quite opposite, turns of national development, that nevertheless agreed in this, that the 'Western Powers' devoted themselves entirely to the tasks of real life. Meanwhile metaphysics were left to us in Germany.

And yet it were the greatest ingratitude, if we were to look back upon those great epochs of purely intellectual effort with depreciation or even with lack of sympathy. It is true that we, like Schiller's Poet, came off empty at the partition of the world. It is true that the intoxication of Idealism with us—perhaps we may say, and its after-pangs also—is now over, and that we are no longer content with a spiritual sojourn in the heaven of Zeus. We are reaching manhood later than other nations, but we have also experienced a more beautiful, richer, if almost too enthusiastic a youth; and it must be proved whether

our people has been enervated by these intellectual delights, or whether in its ideal past it possesses an inexhaustible spring of force and freshness, that needs only to be diverted into the channels of a new productiveness to achieve great results. The *one* practical fact that falls in this period of Idealism, the rising of the people in the liberation wars, bears indeed the character of a dreamy half-heartedness, but it betrays at the same time a mighty force that is as yet only dimly conscious of its aim.

It is remarkable how our national development, more regular than that of ancient Hellas, started from the most ideal and approximated more and more to the real. At first came Poetry, whose classic age had reached its zenith in the common activity of Goethe and Schiller, when Philosophy, set going by Kant, began its stormy course. After the extinction of the Titanic efforts of Schelling and Hegel, the serious study of the positive sciences came to the front. To the old fame of Germany in philosophical criticism now succeed brilliant conquests in every branch of knowledge. Niebuhr, Ritter, and the two Humboldts may here be especially named as pioneers. Only in the exact sciences, which most concern us in connexion with Materialism, is Germany supposed to be behind England and France; and our men of science are glad to shift the blame of this upon philosophy, that has overgrown everything with its structures of fancy, and has smothered the spirit of sound inquiry. How this is we shall soon see. Here it is enough to observe that at all events the exact sciences stand nearest to the tasks of practical life that at present lie before us, and that their late unfolding in Germany entirely corresponds to the course of development here indicated.

We have seen in the First Book how early Materialism planted itself in Germany; how it was by no means first introduced from France, but, coming here direct from England, had struck out peculiar roots. We have seen how, in fact, in Germany the materialistic controversy of

the last century was carried on with special vigour, and how the dominant philosophy, despite its apparently so easy triumph, in this contest only exhibited its own weakness.

Materialism, without doubt, increased in the general modes of thought, while Klopstock had long ago laid the germ of that luxuriant Idealism in the ground of poetry. That Materialism could not openly show itself is, considering the state of things then in Germany, easily intelligible. We detect its presence more by the persistent polemics against it than by positive creations. And yet we may regard Kant's whole system as a splendid attempt to abolish Materialism for ever, without therefore falling a prey to scepticism.

If we look to the external success of this attempt, it may seem significant enough that from Kant's appearance until the immediate past Materialism in Germany seemed almost blown away. The isolated attempts to explain naturally the origin of man through the development of an animal form, amongst which that of Oken (1819) made most sensation, belong by no means to the succession of strictly Materialistic views. Pantheism, on the contrary, thanks to Schelling and Hegel, became the prevailing mode of thought in the philosophy of nature, a view of things that, with a certain mystical depth, at the same time all but necessarily contains within itself the danger of fantastical extravagances. Instead of strictly separating experience and the sense-world from the ideal, and then seeking in the nature of man for the reconciliation of these spheres, the Pantheist effects the reconciliation of Spirit and Nature by a dictum of the imaginative reason without any critical mediation. Hence the pretensions to the knowledge of the Absolute which Kant thought his Criticism had banished for ever. Kant, of course, knew well enough, and foretold unequivocally, that his philosophy could not possibly expect an immediate victory, since centuries had passed before Copernicus's theory had prevailed over the

prejudices that opposed it. But could the sober and yet vigorous thinker have allowed himself to fancy that, scarcely twenty-five years after the first propagation of his Criticism, a work like Hegel's *Phänomenologie des Geistes* would be possible in Germany? And yet it was his own appearance that called forth our metaphysical Sturm-und-Drang period. The man whom Schiller compared to a constructing king not only afforded nourishment to the 'dustmen' of interpretation, but he begat also a spiritual dynasty of ambitious imitators, who, like the Pharaohs, piled one pyramid upon another into the sky, and only forgot to base them upon *terra firma*.

We are here not concerned to develop how it came about that Fichte seized upon one of the darkest points of Kant's philosophy—the doctrine of the original synthetic unity of apperception,—in order to deduce from it his creative Ego, as Schelling from the A = A, as it were from a hollow nut, conjured forth the universe; how Hegel could declare *Sein* and *Nichtsein* to be identical, amid the joyful acclamations of the inquisitive youth of our universities. The time is over when one heard men talking of Ego and Non-ego, of the Absolute and the Idea, at every street-corner in the homes of the Muses, and Materialism does not require us to describe it to our readers. That whole epoch of philosophical romanticism has not down to our own day produced one single point of permanent value for the criticism of the materialistic question. Every criticism of Materialism, from the standpoint of imaginative metaphysic, can only serve the purpose of an explanation between two co-ordinate standpoints. Where we cannot, as with Kant, reach a higher point of view, we must decline such excursions.

That we cannot look down with the depreciation that has now become fashionable upon the services of Schelling and Hegel, but especially of the latter, is quite a different matter. A man who gives to the enthusiastic tendency of several decades a dominant and overwhelming expression

can never be altogether unimportant. But if we consider only the influence of Hegel on the writing of history, especially with reference to the treatment of the history of civilisation, it must be admitted that in his own way he has mightily contributed to the advancement of science.[43] The poesy of ideas has a high value for science, if it proceeds from a rich and many-sided scientific culture. The ideas which the philosopher of this stamp produces are more than dead rubrics for the results of inquiry; they have a wealth of relations to the essence of our knowledge, and therefore to the essence of that experience which is alone possible to us. If inquiry uses them rightly, it can never be hindered by them; but if it submits to be manacled by a philosophic dictum, then it loses its own proper life. Our doctrine of the invalidity of all metaphysic as opposed to strict empiricism, whenever it is a question of a definite piece of knowledge, lies unconsciously in human nature. Every one believes in the experiment he has clearly seen, and still more in that which he has made himself. Inquiry was able in its first childish

[43] If sometimes Hegel's influence upon the writing of history is singled out as mischievous, the charge rests especially upon that inclination to bend the facts to suit a philosophical theory, of which we have found so striking an example in the History of Materialism (comp. p. 49, foll.). It is too easy, however, to forget in what a poor condition was the writing of history in Germany before Hegel. Not unjustly, says Zeller (Gesch. d. deutschen Phil., S. 824), "If our own historical writing no longer contents itself with the learned discovery and critical sifting of traditions, with the ordering and pragmatic exposition of facts, but, above all, seeks to understand the deep-lying connexion of events, and to take a large view of the historical development and the intellectual forces that govern it, this progress is not last to be referred to the influence which Hegel's Philosophy of History has exercised even upon those who have never belonged to his school." The true point of view is somewhat missed in opposing to the 'idealistic' tendency in history which began with Kant and Schiller the present tendency as absolutely realistic. When Alex. v. Humboldt (cp. Tomaschek, Schiller in s. Verh. zur Wissensch, S 130) compares the idealistic tendency with the assumption of "vital force" in physiology, we might perhaps more correctly represent the relation of idea and fact in the influence of Darwin's theory upon the study of natural history. We may here, too, dismiss the inclination to construction from a tendency rigidly starting from the facts, without overlooking the importance of so great a point of view for the apprehension and appreciation of the individual.

beginnings to burst the bands of the Aristotelian metaphysic that had been hardening for thousands of years, and shall a Hegel have brought it in its manhood out of Germany as if by mere sleight of hand? In the next section we shall see better what is the true state of the case!

If we now ask ourselves how Materialism emerged again after Kant, we must remember above all that the flood of Idealism which burst over Germany had swept away with it not only Materialism, but at bottom even the properly critical element in the criticism of reason, so that in this respect Kant has had almost more influence upon our own day than upon his contemporaries. The elements of the Kantian philosophy, which *permanently* destroy Materialism, very slightly asserted themselves, and those that momentarily supplanted it might themselves naturally be supplanted upon a fresh change in the character of the time.

Most of our modern Materialists are, of course, inclined *a priori*, and before any examination, to deny roundly the connexion of their views with De la Mettrie, or even with Demokritos. The favourite view is that modern Materialism is a simple result of modern science, and for this very reason not at all to be compared with similar views of ancient times, because our modern sciences did not exist in these earlier times. In that case this book need not have been written. But if it were allowed us to develop successively the decisive principles in the simpler views of earlier times, we must at least have placed the next chapter before the present one.

Let us guard against a very possible misunderstanding. When we maintain the historical connexion we do not, of course, mean by it to explain Büchner's 'Kraft und Stoff' as an unacknowledged use of 'L'Homme Machine.' Not even a stimulus from the reading of such works, nay, not even the slightest knowledge of them, is required to justify us in supposing an historical connexion. As the heat-rays of the glowing coal scatter themselves in every

direction from one point, in order, when thrown back from the elliptic mirror, to ignite the glowing tinder, so the influence of an author—and especially of the philosopher—loses itself in the consciousness of the crowd, and from out this consciousness the scattered principles and views act upon the later-ripening individuals, whose receptivity and position determine their suitability to collect such rays. That our comparison halts is matter of course, but still it explains one side of the truth; now for the other!

If Moleschott could say that the man is the sum of parents and nurse, of place and time, of air and weather, of sound and light, of food and dress, we may venture to lay down a similar canon for intellectual influences. 'The philosopher is the sum of tradition and experience, of brain-structure and environment, of opportunity and study, of health and society.' Somewhat thus might run the canon, which should at all events show, obviously enough, that even the materialistic philosopher cannot attribute his system to his studies only. In the historical connexion of things one step strikes upon a thousand threads, and we can follow only one at once. Indeed we cannot always do even this, because the coarser and visible thread branches into innumerable smaller threads, that partially escape our view. That the influence of the modern sciences upon the special development of Materialism, and particularly upon its spread and wider propagation, is very great, need not be said. Our exposition, however, will sufficiently show that most of the questions we have now to do with are just the old ones, and that only the material is changed, but not the aim or the method of demonstration.

It must, of course, be at once admitted that the influence of the physical sciences was always calculated, even during our idealistic period, to maintain and advance materialistic principles. With the awakening, therefore, of a keener and universal feeling for the natural sciences, such views naturally at once found themselves at home, even though they

may not at once have assumed a dogmatic attitude. And we must not forget that the study of the positive sciences remained cosmopolitan, while philosophy in Germany struck out an isolated path corresponding to the general feeling of the nation. The German man of science, however, must have necessarily shared not only in the sympathy with the inquiries of foreigners, but also the spirit in which these inquiries were instituted and the ideas that linked the details together. In the most influential nations it was the views of the seventeenth and eighteenth centuries that on the whole prevailed, even though, as a rule, any attempt to push things to their consequences was avoided. In France especially a materialistic basis was given to physiology by Cabanis, just at the very moment when in Germany Idealism was being carried to the highest pitch by Schiller and Fichte (1795 and onwards). As a philosopher, indeed, Cabanis was anything but a Materialist.[44] He leaned to a pantheism bordering on the Stoic doctrine, and regarded the knowledge of 'first causes' (we might say, in Kant's language, of the 'thing-in-itself')

[44] Cf. Cabanis, Rapports du Physique et du Moral de l'Homme et Lettre sur les Causes Premières, 8e ed. augm. de Notes, &c., par L. Peisse: Paris, 1844. The first half of the work was read towards the end of 1795 in the Academy, and printed in its Proceedings, 1798–99; the second half appeared with the collected works in 1802. The 'Letter on First Causes,' one of his last productions, was only published long after the author's death—in 1824. There has been much controversy whether the pantheistic philosophy of the Letter, and especially the clearly expressed *Vitalism* (assumption of a *substantial* vital force over and above the organic forces), are consistent or not with the materialistic spirit of the principal work. The editor, Peisse, has shown in the prefixed essay on the life and doctrines of Cabanis, and in several of his notes, that we must not look in Cabanis for any strict philosophical consistency; that his writings may contain many small vacillations and even contradictions, but that there is no occasion to suppose a change of view, or a conscious retractation between the chief work and the metaphysical Letter. Thus, *e.g.*, it is shown from a passage in an earlier work that Cabanis, even before writing the 'Rapports,' was a decided adherent of Stahl's 'Vitalism.' His leaning to pantheism can be easily gathered from the historical section of the 'Rapports,' especially from his views of the natural philosophy of the Stoics. It is by no means incompatible with this that we find in Cabanis nearly all the watchwords of our modern Materialists, as, *e.g.*, the idea that *thoughts are a secretion of the brain* (*loc. cit.*, S. p. 138).

as impossible.[45] He often controverts the doctrine of Epikuros. But in the scientific study of man he is the pioneer of the *somatic method.* In the sphere of phenomena, or, as it is expressed in his phrase, when we deal with the 'secondary causes,' which alone are accessible to man, we find intellectual functions everywhere dependent upon organisation, and sensation is the basis of thought and action. To the demonstration of this connexion his work is devoted, and his readers and disciples naturally keep to the heart of his theme, to the aim and matter of his work, without troubling themselves much with any introductory or casual expressions of a philosophic character. Since Cabanis, therefore, the resolution of mental functions into the activity of the nervous system has kept its ground in physiology, whatever individual physiologists may have thought as to the ultimate grounds of all things. It belongs to the nature of the special sciences that subject-matter and method go from step to step, while the philosophical background is constantly changing, if indeed it exists at all. The mass of men hold fast to the comparatively constant factor, and regard as justified only what is obvious, useful, and practical. In this way there must necessarily be developed from the study of the special sciences—so long as philosophy is not in a position to assert its counter-influence amongst all educated men—an ever new Materialism, which is perhaps only the more obstinate the less it is consciously regarded by its disciples as a philosophical theory of things. But for the same reasons this Materialism does not far overstep the limits of special studies. It must be deeper reasons that suddenly excite the scientific student to examine the principles that underlie his notion of the world, and this process is inseparable from that reflection and collection of ideas under one single point of view, the philosophical character of which is unmistakable.

That such a turn took place just in Germany while in

[45] Cf. II. Mémoire, § 8, pp. 141, 142.

England and France Materialism ceased to appear conspicuously in the arena, depends no doubt upon the circumstance that here men had become more accustomed than in any other country to philosophical controversies. We may say that Idealism itself lent assistance to Materialism in awaking the sense for the systematic working out of leading ideas, and in provoking by its very opposition the young and aspiring natural sciences. To this was added that in no country had such general freedom been attained from religious prejudices and ecclesiastical pretensions, and one's own ideas, as it were, so much claimed as a necessity for all educated persons. Here, too, it was Idealism that had prepared the way in which Materialism might later move along, almost without any hindrance worth naming; and if this circumstance is often entirely overlooked by Materialists, or even entirely misrepresented, this is only one of the many signs of the unhistorical sense that is so often found combined with Materialism.

At the same time, we must not forget that there has never been wanting in Germany a sense for the scientific consideration of things, though this tendency in the flowering time of our national literature was thrown into the shade by ethical elevation and speculative enthusiasm. Kant himself was quite the man to combine the two tendencies in his thinking, and especially in his pre-critical period he not unfrequently comes very near to Materialism. His pupil and opponent, Herder,[46] was thoroughly imbued with scientific modes of thought, and might perhaps have been able to do much more for the development of the scientific sense in Germany, if he had been content to work for his ideas in positive fashion, instead of engaging with Kant in a controversy over principles, bitter and full of misunderstandings. How far Goethe was carried by genuine

[46] We can here refer to the clever and instructive 'Geschichte der Entwickelung der Naturwissenschaftl. Weltanschauung in Deutschland' by Dr. H. Böhmer. The author indeed exalts Herder at the expense of Kant, and favours a 'Realism' the defects of which we hope to show farther on.

scientific feeling is every day becoming more generally recognised. In many of his expressions we observe a calm and gentle tolerance towards the one-sidedness of the idealistic tendency, the kernel of truth in which he knew how to value, while at the same time his mind felt itself gradually drawn more and more decidedly to the objective view of nature. His relation to the philosophy of nature school must therefore not be misinterpreted. He, the poet, was at least freer from fantastic extravagance than many a professed man of science. But even the philosophers of nature show us in truth only an odd fusion of the universally ruling Romanticism with genuine receptiveness for the observation of phenomena and the tracing of their connexions. With such preparations the general transition of the nation from the period of Idealism to a sober and objective mode of thinking must in time necessarily bring Materialism also again to the front.

If we wish to fix a definite point to describe as the end of the idealistic period in Germany, no such distinctive event offers itself as the French Revolution of July 1830.

The idealistic patriotism of the times of the liberation had become soured in prison air, languishing abroad, and evaporating beneath the indifference of the masses. Philosophy had lost its charm since it had entered into the service of Absolutism. The magnificent abstraction which had created the formula that the *actual* is at the same time the *rational* had in the North of Germany performed the meanest beadle-offices long enough to excite a universal distrust of philosophy. In poetic literature men had become sated with Romanticism, and Heine's *Reisebilder* had struck a note of frivolity that one would hardly have looked for in the country of Schiller. The author of this characteristic product of the time took up his abode in Paris in 1830, and it became the fashion to despair of Germany's future, and to regard the more realistic France as the model of the new epoch. About the same time the spirit of enterprise in commerce and industry began to

bestir itself. Material interests developed, and, as in England, they soon combined with the natural sciences against everything that seemed to turn man aside from his immediate purposes. Yet literature for some decades still dominated the national point of view; but into the place of Classicism as well as Romanticism Young Germany forced its way. The rays of materialistic modes of thought gathered themselves together. Men like Gutzkow, Th. Mundt, and Laube by their writings contributed much of the leaven of Epikurean views. The last especially tugged hard at the mantle of honour with which our philosophy had concealed the deficiencies of its logic.

Yet it is just Epigoni of the great philosophical epoch to whom the revival of Materialism is commonly referred. Czolbe regards D. F. Strauss as the father of our modern Materialism; others, with more justice, name Feuerbach.[47] It is certain that in the use of this name too exclusive reference has been had to religious controversies; and yet Feuerbach stands so near to Materialism that he demands special consideration.

Ludwig Feuerbach, the son of the famous criminal lawyer, early displayed an earnest, laborious nature, and more character than spirit and vivacity. Drawn into the vortex of Hegelian enthusiasm, in his twentieth year he started as a student of theology upon his pilgrimage to Berlin, where Hegel was then (1824) already clothed in the full dignity of the state philosopher. Philosophemes in which being was not replaced by not-being, and the positive obtained from the negative, were in official edicts characterised as "shallow and superficial."[48] Feuerbach's

[47] There can here be no question, of course, of Strauss's latest appearance.

[48] In a circular rescript from the Ministry of Education and Medicine, of 21st August 1824: "The Royal Science Examinations Commission is invited at the same time to have strict regard to the thoroughness and inward content of philosophy and its study, in order that the *shallow and superficial philosophemes* which have recently but too often formed the whole study of philosophy may at length yield to a thorough training in philosophy, and that the true philosophical study may again receive its honoured and valuable position, and

thorough nature worked its way from the Hegelian abysses into a certain "superficiality," without, however, ever losing the traces of the Hegelian profundity. To a clear logic Feuerbach never attained. The nerve of his philosophising remained, as everywhere in the idealistic epoch, divination. A "consequently" in Feuerbach does not, as with Kant and Herbart, carry the force of a real, or at least intended, inference of the understanding, but it means, as with Schelling and Hegel, a leap to be taken in thought; and therefore his system, too, floats in a mystic gloom which is by no means adequately illuminated by the emphasis put upon sensibility and picturableness.

"God was my first thought, Reason my second, Man my third and last thought." By this expression Feuerbach denotes not so much different phases of his philosophy as rather merely the stadia of his youthful development; for soon after his habilitation (1828) he openly set forth the principles of his humanity-philosophy, to which he afterwards held unshakably fast. The new philosophy is to hold the same relation to Hegel's philosophy of reason as this holds to theology. A new epoch is now therefore to begin, in which not only theology but also metaphysic appears as an obsolete standpoint.

It is remarkable how nearly this view coincides with the doctrines which about the same time the noble Comte, a lonely thinker and friend of man, struggling with poverty and depression, was trying to assert in Paris. Comte, too, speaks of three epochs of humanity. The first is the theological, the second the metaphysical, the third and last is the *positive, i.e.*, that in which man applies himself, with

the academic youth, instead of being confused and darkened by that sham-philosophy, may be led by a thorough training in the genuine philosophic spirit to the clear, right, and thorough application of their mental powers." Rönne, Unterrichtswesen des Preuss. Staates, ii. S. 42. "That sham-philosophy" is probably Beneke's; cf. Ueberweg, Grundr. d. Phil., iii. 3 Aufl. 319. The tendency and effect of the edict must, under the then circumstances, necessarily have been directed to a monopoly for the philosophy of Hegel.

all his might and main, to reality, and finds his satisfaction in the resolution of actual problems.[49]

In common with Hobbes, Comte places the aim of all science in the knowledge of the laws that regulate phenomena. "To see, in order to foresee; to inquire what is, in order to conclude what will be," is for him the task of philosophy. Feuerbach, on the other hand, declares, "The new philosophy makes man, including nature as the basis of man, the one universal and highest object of philosophy,"—makes anthropology, therefore, including physiology, the universal science.[50]

In this undue prominence given to man lies a trait which is due to the Hegelian philosophy, and which separates Feuerbach from strict Materialists. That is to say, it is only the philosophy of spirit over again that meets us here in the shape of a philosophy of sensibility. The genuine Materialist will always incline to turn his gaze upon the great whole of external nature, and to regard man as a wave in the ocean of the eternal movement of matter. The nature of man is to the Materialist only a special case of universal physiology, as thought is only a special case in the chain of the physical processes of life. He likes best to range the whole of physiology in the general phenomena of physics and chemistry, and chooses

[49] On Comte and his system, cf. 'Auguste Comte and Positivism,' by John Stuart Mill: London, 1865. A brief view of the idea and aim of Positivism is given in the 'Discours sur l'Esprit Positif,' par M. Auguste Comte: Paris, 1844 (pp. 108, 80). Comte's chief work is the six-volumed 'Cours de Philosophie Positive,' 1830–42; second edition, with Preface by Littré, 1864. Comte has only recently received any attention in Germany. In Ueberweg's Hist. of Philos., (Grundr, iii. 361 ff. E. T. ii. 344), there is a short account of him by Paul Janet, which, however, is so far unjust to Comte that it makes his doctrine of the three stages, theological, metaphysical, and positive, merely the *negative* part of his philosophy, so that as positive part we have only two notions, "a certain historical hypothesis," and "a certain co-ordination of the sciences." In fact, his positive achievement lies chiefly in the attainment and consistent carrying out of the idea of the 'positive,' which is peculiar to Comte. More exact information is given by Dühring, Krit. Gesch. d. Phil., 2 Aufl.: Berlin, 1873, S. 494–510.

[50] Grundsätze der Philos. d. Zukunft: Leipzig, 1849, S. 81, § 55.

to give man too insignificant rather than too important a place in the series of existences. In practical philosophy, indeed, he will occasionally go back to the nature of man, but there, too, he will have little inclination to ascribe divine attributes to his nature, as Feuerbach does.

The great relapse of Hegel compared with Kant consists in his entirely losing the idea of a more universal mode of knowing things as opposed to the human mode of knowing them. His whole system moves within the circle of our thoughts and fancies as to things, to which high-sounding names are given, without our ever getting to understand what validity can be attached to phenomena and to the notions collected from them. The antithesis between "essence" and "appearance" is in Hegel nothing more than an antithesis of two human modes of conception, which are soon again confounded. The phenomenon is defined as the appearance filled with the essence, and reality is thus where the phenomenon is the entire and adequate manifestation of the essence. The delusion that there can be any such thing as "entire and adequate manifestation of the essence" in the phenomenon has extended to Feuerbach also, and yet he explains reality as being simply sensibility, and this it is that brings him near to the Materialists.

"Truth, reality, sensibility are identical. Only a sensible being is a true, a real being; only sensibility is truth and reality." "Only through the senses is an object in the true sense given — not through thought in itself." "Where there is no sense there is no being, no real object." "While the old philosophy had started from the principle: I am an abstract, merely thinking being; the body is no part of my being; the new philosophy, on the other hand, begins with the principle: I am a real, a sensible being; the body is part of my being; nay, the body is its totality, is my ego, is itself my essence." "True and divine is only what needs no demonstration, what is immediately certain of itself, speaks for and asserts itself immediately, carries

immediately with it the affirmation that it is—the absolutely certain, the absolutely indubitable, the sun-clear. But clear as the sun is only the sensible; only where sensibility begins does all doubt and controversy cease. The secret of immediate knowledge is sensibility."[51]

These propositions, which stand in Feuerbach's 'Grundsätze der Philosophie der Zukunft' (1849), almost as aphoristically as we here put them together, sound materialistic enough. And yet we must observe that sensibility and materiality are not identical notions. Form is not less an object of the senses than matter; indeed, true sensibility gives us always the unity of form and matter. We attain these ideas only by abstraction, by thought. By further reflection we then attain to a comprehension of their relation in any particular mode. As Aristotle everywhere gives the precedence to form, so all Materialism gives it to matter. It is one of the absolute criteria of Materialism that force and matter are not only conceived as inseparable, but that force is, in fact, conceived as a property of matter, and, moreover, that from the interaction of matter and its forces all the forms of things are deduced. We may make sensibility a principle, and still, in the essential foundation of the system, be Aristotelian, Spinozist, and even Kantian. Let us only assume, for example, that what Kant expresses as conjecture is fact, viz., that sensibility and understanding have a common root in our nature. Let us then go a step farther, and deduce the categories of the understanding from the structure of our organs of sense; the principle may still remain that sensibility itself, which thus underlies the whole phenomenal world, is only the mode in which an existence, whose real properties we do not know, is affected by other existences. There is then no logical reason to prevent our so defining reality that it coincides with sensibility, while we must, of course, maintain that behind what is thus for man

[51] These principles are in sects. 32, 33, 37, and 39 of the 'Grundsätze der Phil. d. Zukunft.'

reality a more universal existence is concealed, which, if conceived by different organs, appears also different. We might, in fact, retain the ideas of the reason together with the basing of the practical philosophy upon the consciousness of the moral agent that is peculiar to Kant; only, of course, the intelligible world must be conceived under the figure of a sensible world. Instead of Kant's sober morality, there would then result a many-coloured and glowing religion, whose sensibility, being the result of thought, could not indeed lay claim to the reality and objectivity of immediate sensibility, but might well pass, like Kant's ideas, for a representation of the higher and more universal reality of the intelligible world.

In this slight digression into the realm of possible systems, we have, indeed, got pretty far from Feuerbach; but hardly much farther than Feuerbach himself is removed from strict Materialism. Let us, then, look also at the idealistic side of this philosophy of sensibility!

"Existence is a secret of intuition, of sensation, of love. Only in sensation, only in love has This—this person, this thing—that is, the individual—absolute worth, is the finite, the infinite; herein, and only herein, consist the infinite depth, divinity, and truth of love. In love alone is the God who numbers the hairs upon our heads, truth and reality." "Human sensations have no empirical, anthropological meaning in the sense of the old transcendental philosophy; they have an ontological, metaphysical meaning; in sensations, yes, in everyday sensations, are concealed the deepest and highest truths. Thus is love the true ontological proof of the existence of an object outside our brain; and there is no other proof of existence than love and sensation generally. That only exists whose existence brings thee joy, whose non-existence brings thee pain." [52]

Feuerbach had at least so much after-thought that he did not, *e.g.*, regard the existence of living and thinking

[52] *Loc. cit.*, § 34.

beings in Jupiter or in a distant solar system as exactly impossible. And yet, if all philosophy is treated as if man were the only, indeed the only conceivable being of cultivated intellectual sensibility, this is, of course, a deliberate self-limitation. Feuerbach is in this respect Hegelian, and at bottom favours with Hegel the principle of Protagoras, that man is the measure of things. True with him means what is true for man; that is, what is apprehended with human senses. Hence he declares that sensations have not merely anthropological but metaphysical meaning; that is, that they are to be regarded not merely as facts in the individual man, but as proofs of the truth and reality of things. Hence also an advance in the subjective value of the sensible. If sensations are the basis of the metaphysical element, they must also, psychologically speaking, be the proper substance of everything intellectual.

"The old absolute philosophy rejected the senses merely into the sphere of phenomena, of finite things, and yet in contradiction to this make the absolute, the divine, the subject-matter of art. But the subject-matter of art is the subject-matter of sight, of hearing, of feeling. And therefore not only the finite, the phenomenal, but also the true, divine essence is an object of the senses—the senses the organs of the absolute.

"We feel not only stones and wood, not only flesh and bone, we feel also feelings when we press the hands or lips of a feeling creature; we catch by the ears not only the rushing of the water and the rustling of the leaves, but also the earnest voice of love and wisdom; we see not only mirror-surfaces and coloured figures, but we look into the glance of man. Not the external, then, but also the internal, not only flesh but spirit, not only the thing but the Ego is an object of the senses. Everything, therefore, is sensibly apprehensible; if not immediately, at least mediately; if not with the vulgar, untrained senses, at least with the cultivated senses; if not with the eye of the

anatomist or chemist, at least with the eye of the philosopher." [53]

But are not the 'cultivated senses' and the 'eye of the philosopher' in truth a co-operation of the senses with the influence of acquired conceptions? We must concede to Feuerbach that this co-operation cannot be conceived so merely mechanically as the sum of two functions, a sensible and an intellectual. Together with the intellectual development the senses also are really trained to the knowledge of the perception of the intellectual, and it is very probable that even when we are thinking of the sublimest and apparently the most 'supersensible' objects, the sense-centres of the brain very essentially co-operate. If, however, we wish to separate the sensible element in contemplation from the intellectual, this may be done just as well in art as in any other sphere. The ideal in the head of Juno lies not in the marble, but in its *form*. Sense, as such, sees primarily the white gleaming marble; to the perception of the form some degree of cultivation is necessary, and in order to appreciate the form itself completely, thought must come out to meet the thought of the artist. Now it may well be—and this goes farther even than Feuerbach's standpoint—that even the abstractest thought builds itself up in the material of sensations, just as the most delicate drawing necessarily requires chalk or pencil; we shall then be still able to distinguish the *form* of the succession of sensations from the material element of the sensations, just as much as we distinguish the form of Cologne Cathedral from the trachyte blocks of which it is constructed. The form of the cathedral, however, may be represented in a drawing; is the notion very remote that that form of the succession of sensations, which is the spiritually significant element in the intuition of a work of art, is essentially independent of the correct material of human sensation, to which it is, of course, for us more

[53] *Loc. cit.*, §§ 40, 42.

immutably annexed? The idea is indeed transcendental, but it contains no contradiction.

The worst point is at bottom this, that Feuerbach, besides sensation, still recognises, quite in the spirit of Hegel, an absolutely sensationless thought, and thereby introduces an irremediable discord into the nature of man. The prejudice that there must exist a sensationless, quite pure abstract thought, Feuerbach shares with the masses; unfortunately also with the great mass of physiologists and philosophers. But it fits his system less than any other. Our most significant ideas work themselves out in the finest material of sensation, so fine as to be indiscernible by careless self-observation, while the strongest sensations often have but a subordinate value in relation to our personality, and still less logical content. But there can hardly be a sensation in which there is not also felt a relation to other sensations of the same class. When I hear the sound of a bell, my sensation is conditioned in its very first immediateness by my knowledge of the bell. It is just because of this that an entirely strange sound is so unusually exciting. The universal is in the particular, the logical in the physiological, as matter is in form. What Feuerbach tears asunder metaphysically is only logically separable. There is no pure thought, containing only the universal. There is also no sensation having nothing of the universal. The individual sensible thing, as Feuerbach conceives it, does not, in fact, occur, and therefore also it cannot be the only reality.

It has always seemed remarkable to us that intelligent opponents have often urged it against Feuerbach that his system must morally lead necessarily to pure Egoism. The very contrary of this might rather be objected, namely, that Feuerbach expressly recognised the morality of theoretical Egoism, while the consequences of his whole system must necessarily lead to the very opposite. He who derives the notion of existence even from love cannot possibly retain the morality of the "Système de la Nature."

Feuerbach's peculiar moral principle, which, it is true, he sometimes flatly contradicted, must rather be denoted by the pronoun of the second person; he invented Tuism! Let us hear the basis!

"All our ideas spring from the senses; so far Empiricism is perfectly true, only it forgets that the most important and essential object of the senses to man is man himself—that the light of consciousness and understanding is kindled only in the glance of man at man. Idealism is therefore right in seeking in man the origin of ideas, but wrong in trying to derive them from isolated man as a being existing for himself and fixed as a soul—in a word, from the Ego without the sensuously given Thou. Ideas arise only through communication, only out of the converse of man with man. Not alone, but only in virtue of a duality, we attain to ideas and to reason. Two human beings appertain to the production of man, as well of spiritual as physical man; the community of man with man is the first principle and criterion of the true and the universal.

"The individual man by himself does not contain the nature of man in himself, either in himself as a moral or as a thinking being. The nature of man is contained only in the community, in the unity of man with man—a unity, however, which rests only upon the reality of the distinction of I and Thou.

"Isolation is finiteness and limitation, community is freedom and infinity. Man by himself is but man; man with man, the unity of I and Thou, is God."[54]

[54] *Loc. cit.*, §§ 42, 61, 62. These very important passages have been quite overlooked by, *e.g.*, Schaller in his 'Darstell. u. Kritik der Phil. Feuerbachs,' Leipzig, 1847, and it is therefore not to be wondered at that he identifies Feuerbach's ethic with Stirner's, and so concludes that Egoism and sophistic, 'die principielle Entsittlichung des Geistes,' as inevitable consequences of Feuerbach's principles. Here let us only add farther, that it was tempting enough to parallel Feuerbach's 'Tuism' with Comte's 'Altruism;' but still, without long explanations, it would have been impossible to exhibit their common features without allowing the similarity to appear greater than it really is. Feuerbach always starts

A little consecutiveness must have led Feuerbach to deduce from these principles that all human morality and the higher spiritual life rest upon the recognition of another. Instead of this, he relapsed into theoretical Egoism. The blame of this must be sought partly in the want of connexion in his speculation, partly in his struggle against religion. Opposition to the doctrines of religion carried him away into recognising the morality of Holbach, which is opposed to his system. The man who in German literature has most preached Egoism recklessly and logically—Max Stirner—finds himself in distinct opposition to Feuerbach.

Stirner went so far in his notorious work, 'Der Einzige und Sein Eigenthum' (1845), as to reject all moral ideas. Everything that in any way, whether it be external force, belief, or mere idea, places itself above the individual and his caprice, Stirner rejects as a hateful limitation of himself. What a pity that to this book—the extremest that we know anywhere—a second positive part was not added. It would have been easier than in the case of Schelling's philosophy; for out of the unlimited Ego I can again beget every kind of Idealism as *my* will and *my* idea. Stirner lays so much stress upon the will, in fact, that it appears as the root force of human nature. It may remind us of Schopenhauer. Thus are there two sides to everything!

Stirner does not stand in so clear a relation to Materialism, nor has his book had so much influence, that we need linger with him. It is rather time for us to turn to the present.

The breaking up of German Idealism, which we date from the year 1830, passed gradually into a struggle against the existing powers in State and Church, in

from the individual who seeks his completion in another, and only comes to act for the whole by personal affection. In Comte society and man's social impulse is the starting-point; and his moral law, 'vivre pour autrui' does not flow freely, like a passion from the heart, but must be supported by the notion of duty towards society.

which philosophical Materialism played directly only a subordinate part, although indeed the whole character of the time began to incline towards Materialism. We might close the record of German poetry with the year 1830, and we should lose little of real importance. Not only was the Classical period over, but the Romanticists also had sung themselves out; the Schwabian school was past its bloom, and even of Heine, who exercised so large an influence upon the new period, almost everything that is animated by the breath of Idealism lies before that point. The famous poets were dead or dumb, or had taken to prose; what was still being produced bore an artificial stamp. It is impossible to demand a more speaking proof of the inner connexion between speculation and poetry than the way in which this transition is mirrored in philosophy. Schelling, once the most conscious representative of the ideas of the time, an exuberant apostle of production, produced nothing more. The age of genius, with its quickly ripened fruits, was gone by, like a flood-tide that has given way to the ebb. Hegel, who seemed to dominate the age, tried to confine the idea into ossified formulas. In his system, indeed, the influence of the great idealistic period upon the younger generation still continued most decidedly—but with what transformations! Most of all, the understanding of Schiller disappeared, as was shown by the approval that the public gave to Börne's worthless criticism.

Gervinus, who gave distinct expression to the idea that our period of poetry had for a time come to an end, ventured the opinion that a period of *political* activity must now follow, in which Germany, under the guidance of a political Luther, should raise itself to a higher form of existence. But he forgot that to such a regeneration of form a new idealistic impulse would have been necessary, and that to the realistic period then beginning material welfare and the development of industrial activity ranked first in importance. It was towards France—"realistic"

France—that men loved to look even from a political point of view. But what so specially endeared the July monarchy and French Constitutionalism to the men who now gave the tone in Germany was their relation to the material interests of the monied classes. Now for the first time was it possible in Germany for a merchant and a promoter of limited companies like Hansemann to become the leader of public opinion. Chambers of commerce and similar societies shot up at the beginning of the 'thirties' like mushrooms from the ground. In education, polytechnic institutes, institutions for technical teaching, and commercial schools were established by the citizens of flourishing towns, while the undeniable failings of the grammar-schools and universities were regarded through the magnifying-glass of failing sympathy. Governments tried here to check, there to anticipate, but on the whole showed themselves seized by the same spirit. A small but characteristic feature was that gymnastic training, which had been abolished because of its idealistic tendencies, was now readmitted on sanitary grounds. The chief activity of Governments was directed to the means of transport, and the most important political result of the whole decade was the German Customs Union. Still more important, of course, subsequently were the railways, in the construction of which the principal towns eagerly rivalled one another. Exactly at the same time the interest for natural science at last established itself in Germany also, and the most important part in the movement was taken by a science most closely connected with practical interests—that of chemistry. After Liebig at Giessen had secured the first laboratory at a German university, the barriers of prejudice were broken down, and as one able chemist after the other issued from Giessen, the other universities saw themselves obliged in time to follow the example that had been set. One of the most important homes, moreover, of the natural sciences was found in Berlin, where Alexander von Humboldt, already a Euro-

pean celebrity, had taken up his abode in 1827. Ehrenberg, Dove, and the two Roses, the chemist and the mineralogist, were already at work here in the 'thirties.' To them joined himself Johannes Müller, who had indeed in his youth passed through the school of the philosophers of nature, but without losing the sober energy of the scientific student. Through his 'Handbuch der Physiologie' (1833), as well as through his indefatigable activity as a teacher, he became the most influential pioneer of the rigidly scientific tendency in physiology; powerfully supported, indeed, by the still deeper and more accurate investigations of Ernst Heinrich Weber, who worked at Leipzig. There was, besides, the French influence, which had again become very great in Germany, and which worked also in this direction. The inquiries of Flourens, Magendie, Leuret, Longet in the field of physiology, and especially, too, in the physiology of the brain and the nervous system, created an immense sensation among the specialists of Germany, and prepared the ground for the subsequent appearance of Vogt and Moleschott. Even then in Germany it was common—if not with the publicity that came later—to draw from these inquiries conclusions as to the nature of the soul. Even in the treatment of mind-diseases, the most powerful impulse to reform came from France. For nothing was so well adapted to put an end for ever to the transcendental dreams of the theologising Heinroth and his disciples as the study of Esquirol's valuable work, which was translated into German in 1838. In the same year also appeared a translation of Quetelet's work on Man, in which the celebrated Belgian astronomer and statistician endeavoured to supply a natural theory of human actions based upon figures.

The most important effect was produced by the retiring of the idealistic flood-tide in the sphere of religion. The enthusiasm for pious Romanticism and poetical Ecclesiasticism disappeared, and left as a sediment the Materialism of a new belief in the letter, and a soulless principle of

authority. While Hengstenberg gave the tone in this direction from Berlin, in the South of Germany the Tübingen School, on the contrary, proceeded with an unwonted keenness to examine the ecclesiastical traditions with the weapons of exact science. While there was even in these efforts—which were at first still combined with an admiration of Hegel—decidedly more genuine Idealism than in the activity of Hengstenberg and his favourers and disciples, yet the application of a cool and strictly rational criticism to the Bible and to ecclesiastical history belonged to the signs of the new age, in which the practical and rational were everywhere asserting themselves.

It cannot, however, be denied that, besides this general tendency of the age to the practical and material, a lively fermentation of mind was kept up by the demand for a better political condition, and by the hatred of the cultivated classes against the reactionary attitude of the Governments. Great as was the sense of weakness in politics, just as great was the feeling of strength in literature, as well imaginative as scientific. The productions of 'Young Germany' received, through the spirit of opposition which expressed itself through them, an importance far greater than their intrinsic merits deserved. In the year 1835—the same year in which the first railway was opened in Germany—appeared Mundt's 'Madonna' and Gutzkow's 'Wally,' a book that sent its author to prison for his attack upon Christianity. And yet another book that appeared in the same year was to strike still deeper at the roots of the Government-Christianity, that was then treated as the shield of all authority—Strauss's 'Life of Jesus. With this book Germany took up the part of leader in that struggle, which had been begun in England and continued in France, for the application of free criticism to religious traditions. Historical and philological criticism had already become the central feature of German science. Here reasons and counter-reasons were easier to grasp than in the field of speculation, and the

book became, as it were, a direct challenge to every one who believed himself to possess the knowledge necessary to examine it. All those transitional standpoints, still coloured by the ideal but undecided, that survived from the age of Romanticism and the older Rationalism, were broken on the critical questions that henceforth predominated. There was a sharper division between men's minds than before.

In the 'forties' the impetus towards a new state of things became aggressive. Men were no longer content to venture a free word or express a bold idea, but they described the existing state of things as absolutely intolerable. When Ruge gave the signal with the 'Hallische Jahrbücher,' the struggle for political liberty combined with scientific and social efforts of many kinds into a united storm of opposition. The ecclesiastical state of things especially became the object of attack, and hence materialistic ideas on the whole became welcome allies, while at the same time Hegelianism and rationalistic criticism occupied the foremost place. In religion those chains were especially galling which an ever-increasing attempt at rehabilitation threatened to impose upon science: in politics the attempts of a vague Romanticism to conjure up the ideas of bygone ages were most irritating. It might almost seem as though a scientific impulse struggling against the barriers of political force was the secret of the tension that soon began to discharge itself. The movement, as ever, became in its progress more idealistic. Religion and poetry were summoned to the fight. Political party reached its height. German Catholicism made the first vent; then a series of storms traversed all Europe, and the year 1848 gave sudden vent to the long-suppressed discontent.

While Materialism had taken its share in the beginnings of this movement, at the moment of the decisive contests, on the other hand, it fell completely behind the idealistic impulses. It was the rebound from the *reaction* that dis-

posed men's minds again eagerly to take up the question of Materialism, and to set forth the *pro* and *con* from many standpoints, if not quite with thoroughness.

A peculiar change in the direction of the general movement of progress may often be observed in Germany. After a period in which certain ruling ideas gather all their forces together into a common impulse, there follows another in which each worker busies himself in his own pursuit. Thus there now arose congresses, excursions, general festivals, central organisations for all possible branches and movements in ever-increasing numbers; and in this very system of co-operative action a new social power quietly and practically developed. But material interests raised themselves with special energy after the political flood of 1848 with the first signs of decided ebb. Austria, which had been shaken to its foundations, tried to achieve a thorough regeneration on the basis of industrial progress. In feverish haste Von Bruck created street after street; commercial treaties, speculations, and financial measures rapidly succeeded each other. Private activity followed suit. In Bohemia were started collieries, furnaces, railways. In South Germany the cotton industry made a great start forward. In Saxony nearly every branch of metal and textile industry was developed more than ever before. Prussia plunged desperately into mining and smelting. Coal and iron became the watchword of the age. Silesia, and still more the Lower Rhine and Westphalia, tried to rival England. In a period of scarcely ten years the coal production of Saxony doubled; on the Rhine and in Westphalia it trebled; Silesia came between. The value of the iron ore produced in Silesia doubled itself; in the western half of the kingdom of Prussia it multiplied fivefold. The value of the collective mining and smelting production more than trebled. The railways were made available for goods transport on an immense scale, and gained an amount of traffic that no one would have anticipated. Shipping increased, and

exports reached in some cases an extravagant extent. An attempt was made to further German unity after the loss of the Parliament by a system of weights and coinage. Thus, characteristically enough, almost all that was saved out of the great movement for unity was the code of regulations for bills of exchange.

With material progress there went hand-in-hand again a new impulse in the natural sciences, and chemistry especially came into even closer relations with life. People might now have contented themselves with positive facts, and especially with the usable results of these sciences, and, for the rest, favoured, as was done in England, a convenient and unthinking orthodoxy. This would have been practical Materialism completely realised; for nothing more surely economises our forces for production, nothing so ensures careless enjoyment, nothing so steels the heart against the hateful shocks of sympathy and of doubts of our own perfection, as that entire spiritual passiveness which rejects as useless all reflection upon the connexion of phenomena and upon the contradictions between experience and tradition.

Germany can never entirely surrender itself to this Materialism. The old creative impulse will not rest; the efforts for the unity of the Fatherland might for a season be forgotten, but not those for the unity of the reason. This architectonic lies closer to our hearts than the architecture of our medieval cathedrals. And if the specially privileged architectress sleeps, meanwhile other trades assert the freedom of commerce, and chemists and physiologists seize the trowel of metaphysic. Germany is the only country in the world where the apothecary cannot make up a prescription without being conscious of the relation of his activity to the constitution of the universe. It is an ideal trait, that gave us, during the profoundest stagnation of philosophy, at least the *Materialistic controversy*, as a reminder to the easily contented masses of the "educated" that, outside the daily habit of labour and

experiment, there lies still an infinite realm, to wander through which refreshes the mind and ennobles the soul.

One merit must ever be exalted in the German science of those days—that as well as it could it took up the gauntlet that was flung down by the arrogant blasphemers of science. There is no surer sign of the impotence and degradation of philosophy than that she was silent while the miserable protégés of miserable princes tried to put a curb upon thought.

It is true, indeed, that men of science were irritated too by men from their own ranks, who, without the least scientific justification, found themselves moved to oppose the spirit that ruled in scientific research. The 'Allgemeine Zeitung,' which had gone over and dedicated the columns of its once more respectable supplements to the less scientific amongst the academic professors, may claim its share in the kindling of the controversy. The year 1852, with its very outset, produced Rudolf Wagner's 'Letters on Physiology.' In April Moleschott subscribed the preface to the 'Circle of Life,' and in September Vogt announced in his 'Pictures of Animal Life' that it was time to make a stand against the increasing plague of authority.

Of the two champions of the Materialistic tendency, the one was an Epigonus of the Philosophy of Nature; the other had been an imperial administrator, and was consequently a desperate Idealist. Both men, though not without the stimulus of original research, shine chiefly in their talent for exposition. If Vogt is clearer and sharper in detail, yet Moleschott had given more thought to the rounding of the whole. Vogt more frequently contradicts himself; Moleschott is richer in propositions to which it is impossible to attach any definite meaning. Vogt's chief work in this controversy—'Köhlerglaube und Wissenschaft'—first appeared after that meeting of men of science at Göttingen in 1854 which almost repeated for us the drama of the great religious contro-

versies of the Reformation age. To the period of warmest controversy (1855) belongs also Büchner's 'Kraft und Stoff,' a work that perhaps created a greater sensation, and was at all events more bitterly condemned, than any other book of the kind. We must distinctly repel the reproaches of immorality that were sought to be made against Büchner, chiefly with reference to his first edition. On the other hand, we can as little recognise the claim to an independent philosophical importance which Büchner sets up. Let us, therefore, first of all examine his pretensions to philosophy!

In the preface to his work, after showing reasons for rejecting the technical language of philosophy, Büchner writes:—

"It lies in the nature of philosophy that it should be common property. Expositions *which are not intelligible to an educated man* are scarcely worth the ink they are printed with. Whatever is clearly conceived can be clearly expressed." *

In these words Büchner sets up an entirely new idea of philosophy, without, however, precisely defining it. What had hitherto been called philosophy was never the common property of all, and could not be understood by "every educated man," at least not without deep and thoroughgoing preparation. The systems of Herakleitos, Aristotle, Spinoza, Kant, Hegel, demand the most strenuous exertions, and if, even then, not everything in them is intelligible, this may be the fault of these philosophers. That their works were worth more to our forefathers than the ink they are printed with is clear, because otherwise they would not have been printed, sold, paid for, praised, and in many cases even read. It is obvious, however, that Büchner directs his words only at the living, in the most perverse sense of the word. What those systems may have been worth in the past he omits to inquire. Nor does he linger over the question what influence the

* Force and Matter, edited by J. F. Collingwood, 2d ed. 1870, p. xix.

past has exercised upon the present, and whether, it may be, a necessary process of development connects our present speculation with the exertions of those philosophers. We must also assume that Büchner admits the importance of the history of philosophy, for, like many objects of nature, it will probably also be the case that human thought deserves a study that must not be limited to the most superficial products of speculative activity. Büchner has himself written an essay upon Schopenhauer, in which, indeed, he only endeavours to give the general public some idea of the peculiar speculations of this philosopher, but yet also recognises that Schopenhauer must still exert "an important influence upon the course of our present philosophical development." And yet Schopenhauer represents an Idealism which, by the side of Kant, must be described as reactionary, and which is, moreover, by no means easy to understand.

Büchner again by no means demands merely a better and more intelligible exposition of philosophy; for in what hitherto had been called philosophy there occurred questions which could not be made much more intelligible by the most popular exposition, just because the difficulty lies only in the matter. So far, indeed, we should entirely agree with Büchner that it is quite time to at length eradicate to the last relic the so-called esoteric form of teaching. It is true that most philosophers would be very conveniently disposed of if the radicalism of their peculiar principles were as intelligible as the tractableness of the practical applications that are often brought about by the most singular evasions; but that would have been no great misfortune for the progress of humanity. Kant, who was a straightforward thinker, and who might, moreover, rely upon the great King and the liberal-minded Minister Von Zedlitz, had yet retained so much of the old esoteric principles, that, for instance, he regarded Materialism, because of its intelligibleness, as more dangerous than Scepticism, which presupposes more.

Kant's own deep radicalism is, partly by the difficulty of his standpoint, but partly too by his language, so much hidden, that it only completely reveals itself to the most penetrating and most unprejudiced examination; so much so, that Büchner would perhaps find here more that might be of use in modern speculation than in Schopenhauer, if he would only work his way into the system. While, then, we must agree with Büchner that the intentional difficulties put in the way of the uninitiated must for ever be put an end to, we cannot, on the other hand, hope or wish that the difficulties lying in the subject-matter itself should be banished from the sphere of philosophy. On the one side stands the inevitable consequence of the great democratic era, which no longer admits any secrets of illumination and free thought, and which is anxious to make accessible to the masses the fruits of all that has been achieved by the combined efforts of humanity. But on the other side stands the wish, despite this consideration for the needs of the masses, not to allow science to be impoverished, and, if possible, to prevent the overthrow of modern culture by maintaining all our treasure of philosophical insight. This openness also with regard to the consequences of philosophical doctrine is not desirable so much as a concession to the large mass of the educated, but as an aid to the emancipation of that *largest* mass of all—the lower classes, who are attaining the consciousness of their own higher destiny. Our 'educated' classes, on the contrary, are already so blasé in their polished superficiality, that there is certainly no object in pretending to them longer that there is nothing in philosophy to which they need do more than stretch out their hands in order to know as much as the most famous philosophers. If we wish to give the name of philosophy to that popular intelligence which draws just enough from the results of science to dispel the absurdest superstition, then we must discover a new name for that philosophy which contains the combined theory of all the sciences. Or will it be

denied that, even in the present condition of science, any philosophy in this sense is yet possible?

At all events, the principle that whatever is clearly conceived can be clearly expressed, true as it may be in itself, is capable of great abuse. The great Laplace, in his analytical theory of the calculus of probabilities, has assuredly given a perfect model of clear development, and yet there will not be many amongst those who have only studied a little mathematics for the purposes of a general education who will be able, even with some exertion, to understand this work. In mathematics generally, even the clearest calculation will be as unintelligible as a foreign tongue to any one who is not familiar with the ideas that are employed. But just the same thing may happen in philosophy. Passing over other proofs, we can only point out here that there is no single branch of mathematics which is not also capable of philosophical treatment. Laplace himself subjected the first principles of the calculus of probabilities to a philosophical treatment, and this work is not so much easier to understand than the analytical theory because it is *philosophical*, but rather because it treats only of *principles*. Nevertheless, even this 'philosophical essay on probabilities' would still present serious difficulties to many 'educated' persons.

Here, of course, it is in favour of Büchner's view that philosophy has come forward not merely as the quintessence of the sciences, as the final result of the comparison of their results, but no less as an introduction and preparation. This latter was the sense in which Scholasticism conceived philosophy, and down to the most recent times it continued to be the usual practice in our universities to precede special studies by philosophical lectures. But in England and France the philosophical treatment of things has often actually been confounded with the popular treatment of them. And hence it comes about that Büchner is esteemed in Germany more as a popular polemical writer, while his numerous supporters in England and

France are much more ready to concede him pretensions to philosophical importance.

One of the most remarkable proofs of the relativity of our ideas, moreover, may be found in this very fact, that those qualities that make Büchner seem *clearer* to the general public are the very opposite of what stricter science calls clear. If Büchner had taken, for instance, the idea of hypothesis in a scientific sense, he would probably have remained unintelligible to many of his readers, since it requires no inconsiderable logical training, as well as some idea of the history of the sciences, to grasp this idea in such a shape as to be clear to an accurate thinker. But in Büchner 'hypothesis' means any kind of unjustified assumption, as, *e.g.*, the deduced principles of philosophical speculation.[55] The expression 'Materialism' stands now in its historically proper sense, now is equivalent to 'Realism,' and again to 'Empiricism.' There are, in fact, passages where this most positive of all philosophical ideas is used in a purely negative sense, and almost coincides with Scepticism. There are still greater variations in the meaning of 'Idealism,' which often seems to be almost synonymous with 'orthodoxy.' Just because of this vague use, however, such ideas seem clear to those who do not know the exact force of the terms, and yet feel the necessity of using them. It is much like using one pair of spectacles for different distances and eyes. The man who sees farther in these matters with the naked eye finds everything uncertain through Büchner's spectacles. The man, on the other hand, who is extremely short-sighted thinks that he sees very clearly through this medium, and does in fact really see more clearly than without this assistance. Only it is a pity that the spectacles are at the same time strongly coloured! In particular, it is con-

[55] Most extravagant is the use of the word 'hypothesis' in the 'Concluding Observations' to 'Force and Matter,' S. 259 ff., 1st edition, E.T., 251 *sqq.* Here even religious dogmas are called hypotheses. On the other hand, the correct use is found, *e.g.*, in 'Natur u. Geist,' S. 83, where Atomism is called a 'scientific hypothesis.'

stantly happening to Büchner that he regards the real doctrines of philosophers as too simple, because he observes that in life they are often combined in a conservative way with absurd ideas of daily life. Thus the chapter on 'Innate Ideas' especially can only awake in us dim recollections of the phrases of some unlearned preacher, or the doubtful terms of a reading-book for industrious boys, while we should search modern philosophy in vain for a principle that really sets up the doctrines that Büchner attacks. Here, then, we see also that it is a just punishment for the awkward speech of our gentle philosophers that they must have their ears boxed, as it were, in the open street, without the public feeling the slightest sympathy with them.

As Büchner is hesitating and capricious in the use of individual ideas, so, of course, he cannot be regarded as the representative of a sharply expressed and decided positive principle. Keen, relentless, and consistent is he only in negation; but this keen negation is by no means the result of a dry, purely critical understanding; it springs rather from a wild enthusiasm for the progress of humanity, for the victory of the true and beautiful. Whatever stands in the way of this he has studied sufficiently to follow it up relentlessly. Much, too, that is harmless seems to him suspicious; but whatever is unsuspected, when he does not suppose that there is any trickery, any malicious delaying of scientific and moral progress, all this he can use. Büchner is essentially an idealistic nature. He comes of a family of rich poetic gifts. One of his brothers died early as a poet full of promise; another has made a name as a poet and an historian of poetry; his sister, Luise Büchner, is known far and wide as a talented authoress, and as the collector of the poetry of German women. He himself was distinguished as a student—in this resembling De la Mettrie—chiefly by literary, philosophical, and poetical studies, and by his successes in style. In his case, too, it was his father's

wish that made him take to medicine; and here again he may be compared with his French predecessor in the fact that he at once took sides in his new pursuit, and joined the Rational School. More serious and solid than the Frenchman, he applied his rich and many-sided abilities partly to scientific inquiries, but partly to the popular exposition and the appreciation from a social and political standpoint of the results of our recent researches in physical science. Amid all this activity he never lost sight of the mighty task of advancing humanity.

Although Büchner, stimulated by Moleschott, and in a similar rhetorical way in many of his utterances, gave in his adherence to the most decided Materialism, yet his peculiar tendency—which is indeed only with difficulty to be ascertained from contradictory passages—is rather relativistic.[56] The ultimate riddles of life and of existence are, he often says, not to be solved.[57] But empirical inves-

[56] We must regard as relativistic (if not rather idealistic) the principle, borrowed from Moleschott, that things in general exist only for each other (cf. note 58). Here, too, belongs his doctrine of the infinity of smallness and the necessarily involved relativity of the idea of an atom (cf. Kraft u. Stoff, 1 Aufl., S. 22 ff.; Natur u. Geist, S. 82 ff.). That, notwithstanding, the atoms are treated as facts, discoveries, and so on, must not surprise us in Büchner.—In the Sechs Vorl. über d. Darwin'sche Theorie: Leipzig, 1868, S. 383 ff., Büchner expressly rejects *systematic* Materialism, and would call his philosophy 'Realism.'

[57] The passages in point are, of course, principally in 'Natur und Geist' (Frankf., 1857), an entirely unsuccessful attempt of an otherwise skilful writer to introduce his philosophy to the general public in a calm and impartial exposition. Comp. S. 83: "Da unsre Erkenntniss nicht in das Innerste der Natur reicht und das eigentliche tiefste Wesen der Materie wahrscheinlich immer ein unlösbares Problem für uns bleiben wird;"—S. 173: "Dass ich es vorziehe, Dir unsre Unwissenheit über Zeit und Ewigkeit, über Raum und Unendlichkeit einzugestehen." It is highly characteristic of Büchner's mode of thought when, at S. 176 ff., with reference to the question of the infinity of space and time, he makes the representative of his own standpoint ('August') content himself with saying that the limits which space, time, and causality seem to set to our ideas "are so remote that they scarcely touch my philosophical view of the world and matter." Very noteworthy, too, is the following passage from the first edition of 'Kraft und Stoff' (which was later almost entirely omitted), S. 261: "Hinter dem, was unserer sinnlichen Erkenntniss verschlossen ist, können ja alle denkbaren Dinge existiren, aber Alles dieses kann sie" (die 'Hypothese') "nur willkürlich, nur ideell, nur metaphysich. Wer die Empirie verwirft, verwirft alles

tigation, which only can conduct us to truth, forbids the assumption of anything supersensuous. If we overstep in our speculation the limits of experience, we land ourselves in error from which there is no deliverance. Faith, which then, however, has no longer anything to do with facts, may extravagate into those realms, but reason cannot, may not, follow. Philosophy must proceed from the natural sciences; we must hold fast to what they teach us until by the same method we attain a deeper insight. It is observable that Büchner does not allow any poetical or symbolical value to philosophical or religious principles. He has with his own poetical nature once broken with these questions, and now everything with him is true or false. But this is really to deny not only speculation and religious faith, but even all poetry that gives to ideas figurative expression.

Both Moleschott and Büchner frequently exhibit in the treatment of single questions a genuine philosophical acuteness, which gives place again, however, to scarcely intelligible trivialities. Thus, for instance, in Büchner's 'Force and Matter,' the greatest part of the chapter on 'Thought' is a pattern of cautious dialectic; it is true it is only a fragment, for the admirable criticism of Vogt's famous utterance as to the relation of thought to the brain closes with a complete dualism of force and matter, which is then not reconciled, but only obscured by the rapid flow of words.

"Thought, spirit, soul are not material, not a substance, but the effect of the conjoint action of many materials endowed with forces or qualities." He compares this effect with that of a steam-engine, the force of which we cannot see, smell, or touch, while the steam expelled by it is a mere bye-thing, and has nothing to do with "the object of the engine." Every force can only be "inferred" from its

menschliche Begreifen überhaupt und hat noch nicht einmal gesehen, dass menschliches Wissen und Denken ohne reale Objekte ein non ens ist." That is pretty much what Kant says, only in somewhat different words.

manifestations, or, as it stood in the first edition—much more logically and more in harmony with the context—"ideally constructed." Force and matter are inseparable, but are nevertheless *in thought* very far removed from each other, "nay, in a certain sense, absolutely negative each other." "At least we do not know how spirit, force, could be defined as anything else than as something immaterial, something in itself excluding matter or opposed to it."

The most credulous spiritualist does not need more in order to base his whole edifice; and here again we can see clearly how little room there is to hope that the mere propagation of the materialistic view of nature, with all the knowledge that supports it, will ever be enough to eradicate religious or superstitious opinions to which mankind inclines for reasons that have their roots deeper than in his theoretical views of natural things. That force and matter are inseparably united is, with regard to the visible and apprehensible world, sufficiently proved. But if force is something essentially supersensuous, why shall it not exist in a world that our senses cannot apprehend, either of itself or in conjunction with immaterial substances?

Very much truer and more consistent than that of Büchner is the conception of the older Materialists, who resolve all force into motion, pressure, and collision of matter, and, as was admirably done by Toland in particular, conceive matter as moved in itself, and in fact rest itself as a mere special form of motion.

But independently of the difficulties in the way of carrying out this conception that result from modern physics, with its absolutely incomprehensible action at a distance, there is another point that is equally difficult for every kind of Materialism, only that the difficulty is more concealed in the vague conception of Büchner, which confusedly mixes up mechanical force and spirit. I mean that Büchner formed his whole philosophy, and wrote his principal work, without knowing the law of the persistence of force. When he afterwards came to know it, he devoted

a special chapter to it, and simply ranged it among the new supports of his materialistic philosophy, without ever thoroughly illuminating every corner of his structure with the light of this most important doctrine. Otherwise it must easily have occurred to him that even the processes in the brain must be strictly subject to the law of the persistence of force, and thus, as we shall see better farther on, all forces inevitably become *mechanical*, become movements and elastic forces. We may this way construe mechanically the whole man, including all his intellectually significant acts, but everything that goes on in the brain will be pressure and motion, and from this to 'spirit,' or even to conscious sensation only, the way is exactly as far as from matter to spirit.

How little clearness Büchner attained on this point is shown by a very curious addition which he introduced into his later editions, while retaining the whole confusion of spirit and force. He finds here that the brain, which produces so peculiar an effect as spirit, of all the organs alone becomes *weary* and needs sleep, "a circumstance which establishes not merely an essential distinction between these organs, but also between psychical and mechanical activity in general." Later on the muscles occur to him, and with a superficiality scarcely pardonable in a physiologist he adds, "The same may be said of those muscles which are set in motion from the brain through the nervous system—the voluntary muscles." Büchner has, of course, not bethought himself that the muscles also become weary if the elastic energy collected in them is used up, while the brain would still long be able to transmit to them fresh efferent stimuli.

The reason why men so able and honest as Moleschott and Büchner have not a more thorough grasp of their subject must not therefore be sought merely in the fact that from the first they put popular exposition in the place of philosophy, for even within these limits a much higher standard may be demanded, and popular exposition may

really have philosophical value without quite exhausting the business of philosophy. But then the exposition must be based at least upon a definite theory carried out with clearness and consistency, and with the majority of our Materialists this is not the case. The reason of this may be looked for in the influence of the philosophy of Schelling and Hegel.

We called Moleschott above an Epigonus of the philosophy of nature, and deliberately so. And he is so, not because in his younger days he industriously studied Hegel and later favoured Feuerbach, but because this intellectual tendency is still everywhere observable in his nominally so consistent Materialism; and that just in what are metaphysically the decisive points. Much the same thing is noticeable in Büchner, who not only frequently sets up as an authority Feuerbach, a powerfully *stimulating* but thoroughly unclear thinker, but even in his own utterances often enough wanders into a vague pantheism.

The point here especially in question may be quite clearly indicated. It is, as it were, the apple in the logical fall of German philosophy since Kant—the relation between subject and object in knowledge.

According to Kant, our knowledge arises from the reciprocal action of the two things—an infinitely simple principle, yet one which is constantly being lost again. It follows from this view that our phenomenal world is not merely a product of our conception (Leibniz, Berkeley); that again it is not an adequate picture of actual things, but is a result of objective influences and of the subjective shaping of them. Not, then, what an individual man, through accidental temperament or defective organisation, knows thus or thus, but what mankind in general, through their sensibility and understanding, *must know*, this Kant called in a certain sense objective. He called it objective so far as we speak only of our experience; transcendental, on the other hand, or, in other words, false, if we apply such

knowledge to things in themselves, that is, things existing absolutely quite independently of our knowledge.

His successors, however, thirsted again after absolute knowledge, and entirely abandoning the path of sober explanation, found themselves another by the dogmatic aid of their philosophemes. Then arose the grand axiom of the unity of the Subjective and Objective, the fabulous *petitio principii* of the unity of Thought and of Existence, in which even Büchner is still involved.

According to Kant, there is such a unity only in experience; but this unity is a fusion; it is neither pure thought nor does it give us pure existence. But now, according to Hegel, the contrary should be the case; this absolute thought must coincide with absolute existence. This notion gained ground because of its magnificent absurdity, which corresponded with the need of the age. It is the basis of the notorious Philosophy of Nature. In the troubled fermentation of the Hegelian School it was often found impossible to decide what this notion actually meant. It might, to begin with, be regarded as an actual metaphysical principle, or as a colossal categorical imperative intended to limit metaphysic. In the latter case we approach to Protagoras. Shall we so define the notion of the true, the good, the real, and so on, that we *name* true, good, real, and so on, only that which is so for man; or shall we imagine that what man recognises as such is equally valid also for all thinking beings that do or can exist?

The latter view, which only is peculiar to the true original Hegelianism, leads necessarily to Pantheism; for it already presupposes as an axiom the unity of the human spirit with the spirit of the universe and with all spirits. Part of the Epigoni, nevertheless, held with Feuerbach to the categorical imperative; real means what is real *for man;* that is, because we *can* know nothing of things in themselves we *will* know nothing of them—and there an end!

The old metaphysic would have a knowledge of things

in themselves; the philosophy of nature relapsed into this error. Kant stands alone at the sharp and perfectly clear standpoint that of things in themselves we know only one thing, precisely that one thing which Feuerbach has neglected, namely, that we *must presuppose* them as a necessary consequence of our own understanding; that is, that human knowledge shows itself as a small island in the vast ocean of all possible knowledge.

Feuerbach and his followers, just because they do not observe this, are constantly falling back into transcendental Hegelianism. In the case of Feuerbach's 'sensibility,' it is often very difficult to think of ear and eye, to say nothing of the use of these organs in the exact sciences. His sensibility is a new form of absolute thought, which is wholly independent of the facts of experience. That he notwithstanding gained so great an influence over certain men of science is to be explained not from the nature of the empirical sciences, but from the effects of the philosophy of nature upon 'Young Germany.'

Let us look for a moment at the after-pains attending the birth of the absolute spirit in Moleschott!

In the 'Kreislauf des Lebens,' this skilful writer discusses also the sources of knowledge in man. After a very striking eulogy of Aristotle and a passage upon 'Kant,' in which Moleschott attacks a phantom of this name with principles which the real Kant might concede without affecting his system, there follows the passage that is in our mind. It begins with admirable clearness only to pass gradually over into a metaphysical haze, which even in our mist-haunted Fatherland it would be difficult to match. In accordance with our purpose we will here exhibit the darkest mists in italics:

"All facts, every observation of a flower, or an insect, the discovery of a world, or the detection of the characteristics of man, what else are they but relations of objects to our senses? If a rotifer has but one eye consisting of

a cornea only, will it not receive other pictures of objects than the spider, which exhibits in addition lenses and vitreous bodies? And accordingly the knowledge of the insect, the knowledge of the effects of the outer world is different in the case of the insect and in the case of man. Above the knowledge of these relations to the instruments of his apprehension neither man nor God can raise himself.

"Thus then we know everything in relation to ourselves; we know what the sun looks like to us, how the flower smells to man, how the vibrations of the air affect a human ear. This has been called a limited knowledge, a human knowledge conditioned by the senses, a knowledge that merely observes the tree as it is to us. That is very little, it has been said; we must know how the tree is in itself, that we may not longer delude ourselves that it is as it appears to us.

"But where then is this tree in itself that we are looking for? Does not all knowledge presuppose some one that knows, and consequently a relation between the object and the observer? The observer may be an insect, a man, or, if there are such things, an angel. If the two things exist, the tree and the man, *it is just as necessary for the tree as for the man that it stands to him in a relation that manifests itself by the impression upon his eye. Without relation to the eye into which it sends its rays there is no tree. It is simply by this relation that the tree is in itself.*

"All existence is an existence by means of qualities. *But there is no quality that does not exist simply through a relation.*

"Steel is hard as opposed to soft butter, ice is only cold to the warm hand, trees only green to a healthy eye.

"Or is green anything but a relation of light to our eye. And if it is nothing else, *then is not the green leaf so in itself, just because it is green for our eye.*

"*But then the wall of separation is broken down between*

the thing as it is to us and the thing in itself. Because an object is only through its relation to other objects, for instance, through its relation to the observer, because the knowledge of the object resolves itself into the knowledge of their relations, all my knowledge is an objective knowledge."

It is true enough indeed that all our knowledge is objective knowledge, for it relates to objects. Nay, even more; we must suppose that the relations of the object to our senses are regulated by rigid laws. Through sensible empirical knowledge we stand in as complete a relation to the objects as our nature allows. What more do we need to call this knowledge objective? But whether we perceive the objects as they are *in themselves* is quite another question.

Let us only look now at the italicised passages, and ask in what part of the primeval philosophic forest we are? Are we among the extremest idealists, who do not suppose at all that there is anything without us corresponding to our conceptions of things. Is the tree really out of the world when I shut my eyes? Is there no world at all outside me? Or are we amongst the pantheistic dreamers, who imagined that the human mind can conceive the absolute? Is the green leaf green in and for itself, because it produces this impression upon the human eye; while the eyes of spiders, chafers, or angels are of less importance? There are, in fact, few philosophic systems which cannot be discovered in these principles more easily than Materialism. And how is it then with the basis of this oracle?

As it is merely the contrast to our blood-heat that makes us call ice cold, is there consequently no absolute constitution in the ice independently of any feeling, in accordance with which it enters into a certain interchange of heat-rays with its environment—whether this environment feels or not does not matter? And if this interchange essentially depends upon the temperature and other properties of the environing bodies, does it not at the same time

depend also upon the ice? Is not this constitution by which the ice undergoes in this case one interchange, and in another a different interchange of heat-rays, simply a property belonging to the ice in itself? To our feeling the property regularly produces the impression of cold. We denote it, then, according to the impression that it makes upon us—we call it cold; but we can easily distinguish between the physiological process in *our nerves* and the physical process in *the body itself*. This latter is *in relation* to the former the thing in itself. Whether we may not still further leave out of account not only our nerves of sensation but also our rational apprehension, and seek behind the ice a thing-in-itself, neither existing in space nor time, is a question we do not at all discuss here. We need but a single step in order to show that the qualities of things are distinguishable from our conceptions, and that a thing may have qualities, that it may *exist*, without our perceiving it.

When worm, chafer, man, and angel perceive a tree, are there then *five trees?* There are four conceptions of a tree, presumably very different from each other; but they refer to one and the same object, as to which no individual can know how it is constituted in itself, because it only knows its own conception of it. Man has only this one advantage, that by the comparison of his organs with those of the animal world and by physiological investigations, he succeeds in regarding his own conception as being just as imperfect and one-sided as those of the different kinds of animals.

How is it, then, that the dividing wall between the thing as it is to us and the thing in itself is broken down? If the thing exists only in its relation to other objects, this metaphysical principle of Moleschott's can only reasonably be taken to mean that the thing in itself exists through the sum of all its relations to other objects, but not through a limited portion of them. If I close my eyes, the rays of light which proceeded from the different parts of the tree

to the retina fall now upon the outer surface of my eyelids. That is the only change that has taken place. Whether an object can still exist that cannot interchange light, heat, and sound rays, or electric currents, chemical changes, and mechanical movements with *any* other object, that is, of course, a question. It would be an admirable field for the subtleties of the philosophers of nature. But even if we solve the problem by agreeing with Moleschott, there still always remains between the thing in itself and the thing as it is to me a difference that is nearly as great as the difference between a product of an infinite number of factors and one particular factor of this product.[58]

[58] This entirely applies also to Büchner, who in note 82 to his book, 'Die Stellung des Menschen in der Natur,' Leipzig, 1870, by way of gratitude for our recognition of his poetical nature has devoted a song of praise to the 'thing in itself,' and has prefixed to it a prolix, but not particularly clear, polemic. The total misunderstanding of the Kantian principle that our ideas do not order themselves in accordance with things, but things in accordance with our ideas, we may here leave untouched. Any one who cannot see how this is to be understood from our section on Kant will not learn it from a new discussion in this note. Büchner tries first to resolve the distinction between the thing in itself and the phenomenon into the old distinction of *primary* and *secondary* qualities, but still does not venture to draw the only true consequence of Materialism, that the atoms in movement are the 'thing in itself.' The importance of the physiology of the sense organs for this question is as superficially disposed of by Büchner without going at all into the scientific side of the question, as Materialism often is disposed of by saying that in the main we knew all this long ago. What the present position of science can do to give new and deeper foundations to the general idea that had appeared long ago is most sharply emphasised by Büchner when it suits him, and entirely ignored when it presents difficulties to his standpoint. That, moreover, the Kantian 'thing in itself' is a "new thought-thing," is "unrepresentable," "unknowable," and so on, we do not need to learn from Büchner. "Unthinkable," however, is a very different thing, although Büchner adds it in the same breath with the other predicates. He asserts, however, the thing in itself to be unthinkable "because all things exist only for each other, and without reciprocal relations have no significance." But if these "*relations*" of a thing to man are its *qualities* as perceived *by us*—for what else can they be?—does not this very statement assert the 'thing in itself'? It may be that the thing *without any relations* means nothing, as Büchner supposes, in common with dogmatic Idealism; yet even then it is conceived as the origin of all its real relations to various other things, something more than the mere *relation to ourselves*, which comes to consciousness within us. But the *latter* only is what popular language calls '*the thing*,' and which the critical philosophy, on the contrary, calls '*the phenomenon*.' Further on Büchner shows by the way

No! The thing in itself is not the thing as it is to me; but I may perhaps deliberately substitute this for it; as, for example, I substitute my notion of cold and heat for the actual temperature of bodies. The old Materialism naïvely regarded both as identical. But two things have made this for ever impossible—the victory of the undulation theory and the philosophy of Kant. We may, indeed, push on past their influence, but that is not the way to make an epoch. We should have to settle with Kant. This the philosophy of nature did in the shape of a delirium of revelation which elevated absolute thought to a divinity. A serious settlement must take a very different form. We must either admit the distinction between the thing in itself and the phenomenal world, and content ourselves with improving Kant's development of it, or we must throw ourselves into the arms of the categorical imperative, and thus to a certain extent try to combat Kant with his own weapons.

Here, indeed, there is still a side-door open to us. Kant made use of the infinite void space beyond human experience in order to make room to construct his intelligible world. He did this by means of the categorical imperative, 'Thou canst because thou must.' And therefore there must be freedom. In the actual world of our understanding there is none. Therefore it must exist in the intelligible world. We cannot, indeed, conceive for a moment the possibility of freewill; but we can vaguely think it possible that there are causes in the thing in itself which exhibit themselves in the organ of our rational consciousness as freedom, although, regarded with the organ of the analytic understanding, they present only the picture of a chain of cause and effect.

What, then, if we now start with another categorical

in which he refers the subjectivity of sense-perceptions to particular illusions of the senses, that in this sphere he has not yet sufficiently acquainted himself with the results of experience. He promises to return to the subject in a more suitable place. If this is done with the necessary knowledge, there should be no great difficulties in the way of understanding it.

imperative? What if we put at the head of all positive philosophy the principle, '*Content thyself with the world that is given thee!*' Is not, then, the Fata Morgana of the *intelligible* world annihilated as by a magic wand?

Kant would first maintain that *his* categorical imperative, which from within bids us do the right, is a *fact* of the internal consciousness, of the same necessity and universality as the natural law in external nature; but that this new imperative, which we will call by the name of Feuerbach, is not necessarily found in man, but rather rests upon subjective caprice. Here, then, the opposite party has a not unfavourable game. It is easy to show that the moral law, as a matter of history, only slowly develops itself, and that it can only have a necessary and unconditionally valid character in those cases where it exists in consciousness at all. But if a further historical development brings into play the principle of contentment with this world as the basis of the moral consciousness, no one can make any answer to this. It must show itself.

But, of course, it must *show itself;* and here comes the more serious difficulty. Kant has this on his side, that in every educated individual the moral law attains to consciousness. Its content may in many respects be very various, but the form is there. The fact of the inner voice is certain. We may criticise its universality; we may, on the contrary, extend it to the higher animals: but this does not at all change the main fact. But as to Feuerbach's imperative, the fact has still to be proved that we *can* really content ourselves with the phenomenal world, and with its sensible apprehension. If the fact is proved, then we will readily believe also that an ethical system may be constructed upon it; for what limit is there to construction?

As Kant's system might have been at variance with the knowledge of the understanding if this variance had not been provided for from the first, so the system of contentment stands apparently at variance with the efforts of the

reason towards unity; with art, poetry, and religion, in which lies the impulse to exalt ourselves above the limits of experience. There yet remains the attempt to get rid of these contradictions.

Accordingly, naïve Materialism would hardly have come up again in our own time in systematic shape, as indeed it can hardly do again after Kant. The unconditional belief in atoms has disappeared, like other dogmas. It is no longer supposed that the world is absolutely so constituted as we perceive it with ear and eye; but it is maintained that with the world in itself we have nothing to do.

One only of the modern Materialists has attempted a really systematic solution of the difficulties that present themselves against this standpoint. The same thinker, however, has gone still further. He has, in fact, made an attempt to demonstrate, or at least to render probable, the agreement of the actual world with the world of our senses. This Czolbe undertook in his 'New Exposition of Sensationalism.'

Heinrich Czolbe, the son of a landowner in the neighbourhood of Danzig, devoted himself in early youth to theological and philosophical questions, although he took up medicine as his special pursuit. Here, too, we find the starting-point for his later course in that philosophy of nature which our modern Materialists are so fond of representing as the opposite extreme to their own efforts, and yet by which Carl Vogt alone among their leaders has remained quite unaffected. In Czolbe's case Hölderlin's 'Hyperion' especially was of decisive importance, a work which embodied, in wild and magnificent poetry, the Pantheism due to Schelling and Hegel, and glorified the Hellenic unity of spirit and nature, as compared with German civilisation. Strauss, Bruno Bauer, and Feuerbach, moreover, helped to determine the young doctor's tendency. But it is remarkable that it was a philosopher—and in fact a professor of philosophy, unless that is, as Feuerbach says, a contradiction—who at length gave him the

final impulse to the elaboration of his peculiar materialistic system.

It is Lotze—the man whom Carl Vogt occasionally decorates as joint-manufacturer of the genuine Göttingen soul-substance with the title of a speculating Struwelpeter —Lotze, one of the acutest, and in scientific criticism one of the surest, philosophers of our day—who did this involuntary service to Materialism. The article 'Vital Force' in Wagner's 'Handwörterbuch' and his 'General Pathology and Therapeutic as Mechanical Sciences,' annihilated the phantom of a vital force, and introduced some degree of order into the lumber-room of superstition and confusion of ideas that medical men called Pathology. Lotze had trodden the right path; for, in fact, it is amongst the tasks of philosophy, while making a critical use of the facts supplied by the positive sciences, to react upon them, and to exchange for the gold of special research the results of a wider survey and a more rigid logic. He would no doubt have met more recognition in this course if Virchow had not simultaneously appeared as practical reformer of Pathology, and if Lotze himself had not adopted a peculiar metaphysic of his own, of which it is difficult to understand how it could maintain itself by the side of his own critical acumen.

Czolbe was stimulated by the rejection of the 'supersensuous idea' of vital force to attempt to make the rejection of the supersensuous the principle of philosophy. As early as 1844, his inaugural dissertation on the Principles of Physiology shows these efforts; but it was only eleven years later, when the Materialistic controversy was in full swing, that Czolbe came forward with his 'New Exposition of Sensationalism.'

As we have, generally speaking, taken the idea of philosophical Materialism in a tolerably narrow sense, we must first explain why we here devote special attention to a system calling itself 'Sensationalism.' Czolbe himself must have chosen this term because the idea of sensible

presentation throughout determines his course of thought. This sensible presentation, however, consists in this, that everything is resolved into *matter and its motion.* Accordingly sensible presentation is only a regulative principle, and the metaphysical element is matter.

If we wish to distinguish strictly between Sensationalism and Materialism, we must give the former name only to those systems which hold to the origin of our knowledge from the senses, and attach no importance to the power of constructing the universe from atoms, molecules, or other modifications of matter. The Sensationalist may assume that matter is mere representation, because what we have immediately in perception is only sensation and not 'matter.' But he may also, like Locke, be inclined to refer spirit to matter. So soon, however, as this becomes the essential basis of the whole system, we have before us genuine Materialism.

And yet in Czolbe, too, we no longer find the old naïf Materialism of earlier ages. It is not merely the uniform personal modesty of the author that makes him almost universally throw his views into hypothetical form. He has brought with him enough of Kant to know the doubtfulness of metaphysical dogmas. In general his system stands to Kant, whom he chiefly combats, in a changeful relation, which offers at least as many analogies as oppositions. And therefore a consideration of Czolbe must make much clearer the results that we attained in the last chapter.

Czolbe is of opinion that, despite the passionate strife for and against Materialism, nothing has yet been done to bring this view of things into a satisfactory system. "What in recent times Feuerbach, Vogt, Moleschott, and others have accomplished forms but suggestive and fragmentary assertions, which upon a deeper examination of the matter leave us unsatisfied. As they have only generally maintained the possibility of explaining everything in a purely natural way, but have never attempted a more particular

proof of this, they are still at bottom entirely on the ground of the religion and speculative philosophy which they attack."[59] We shall see sufficiently that even Czolbe never leaves this ground.

Czolbe admits that the principle of his Sensationalism, the exclusion of the supersensuous, may be called a prejudice or a preconceived opinion. "But without such a *prejudice* the forming of a view as to the connection of phenomena is altogether impossible." Besides internal and external experience, he regards *hypotheses* as a necessary element in the forming of a philosophy of things.

Well, prejudice or oracle, hypothesis or poesy, is a question that has yet to be decided. But if the hypothesis is not only to appear in the course of the philosophy, but in the humble guise of a 'prejudice' receives us on the very threshold, we must surely ask, What, then, determines the choice of this or the other original hypothesis? To this question Czolbe has two very different answers. According to one he reached it by induction; according to the other, morality, as in Kant, forms the foundation of the whole positive philosophy, since by the strict use of the understanding nothing of the kind, as a metaphysical principle, can be attained. Both answers may in their way be right. Czolbe sees how Bacon brings about an advance in philosophy by the exclusion of the supersensuous; why should not a new advance be attained by continuing this method? Lotze has banished vital force; why should we not be able to banish all transcendental forces and existences?

As, however, the "Exposition of Sensationalism" proceeds not inductively, but deductively, this induction cannot well form the strict basis of the system: it was only the occasion. The basis lies in the ethic, or rather in the categorical imperative so often mentioned: Content thyself with the world that is given thee.

It is peculiar to Materialism that it is able to establish

[59] N. Darstellung des Sensualismus: Leipzig, 1855. Vorwort, S. vi.

its moral theory without any such imperative, while the philosophy of nature rests upon a practical principle. Thus Epikuros had a moral doctrine which supported itself upon the impulse of nature, while he reduced into the form of a moral law the purification of the soul from superstition by the knowledge of nature.

Czolbe derives morality from the *goodwill* which necessarily develops itself in the intercourse of man with man. The principle of the exclusion of the supersensuous, however, has a definite *moral* aim.

Here our philosopher's theory is very deeply rooted, although he generally puts it forth only in modest and even inadequate terms, or even falls back upon authority. Through our whole epoch runs, as a grand characteristic, the expectation of a great and fundamental, though it may be a quietly and peacefully accomplished, reform of all our views and circumstances. There is a feeling that the era of the Middle Ages is only now drawing to its conclusion, and that the Reformation and even the French Revolution are perhaps only the first dawnings of a new light. In Germany the influence of our great poets combined with the political, ecclesiastical, and social efforts of the time to promote views and inclinations of this kind. But the watchword was given in this, as in so many other respects, by the philosophy of Hegel, through its demand for the unity of nature and spirit, which stood through the long period of the Middle Ages in such sharp antithesis. Fichte already had ventured to apply the outpouring of the Holy Spirit which is spoken of in the New Testament to the light of his own day with the same boldness with which Christ and the Apostles had interpreted the prophets of the Old Testament. Natural insight is only attaining its full development in our own epoch, and is thus manifested as the real Holy Spirit that is to lead us into all truth. Hegel gave to these ideas a more definite direction. His view of the world's history makes the dualism of spirit and nature a great transitional stage

between a lower stage and a higher and purer stage of unity—an idea which, on the one hand, retains points of connection with the innermost motives of ecclesiastical doctrine, and, on the other, has given rise to those exertions which have for their object the entire setting aside of all religion. As these views made way, it was inevitable that Germany should turn its gaze back to classical antiquity, and especially to Greece, where that unity of spirit and nature, towards which we must again approximate, had as yet been most fully manifested. It is in particular in a passage of Strauss that Czolbe finds the results of these speculations happily condensed.

"What Julian endeavoured to maintain from the past," says Strauss in his essay on Julian, "is materially related with what the future ought to bring to us. The free harmonious humanity of Hellenism, the self-supporting manliness of Roman antiquity, is the goal towards which we are about to struggle from out of the long Christian interval, enriched 'with the spiritual and moral gains we have derived from it.' If we ask what will be the philosophy of the future, Sensationalism may so far answer to this view of Strauss, as clearness of conception seems to determine a unity in the harmony of our whole conscious life, and resignation to what knowledge shows us to be impossible or non-existent, a certain manliness of soul or feeling."

Thus Czolbe, and the circumstance that in his later treatise on the origin of self-consciousness he comes back upon this passage, still more clearly exhibits its fundamental importance for his Sensationalism.

"To what has already been said upon the æsthetic significance of Materialism must here be added, that as the true mean or moderation was an essential note of Greek artistic work, so our efforts in this respect also satisfy æsthetic demands. The historical ideal of every effort of this kind, however, was first pointed out with

joyful confidence by the true author of modern Materialism, David Strauss."[60]

Here, again, we see that Strauss has the honour of being designated the father of contemporary Materialism; for Czolbe in fact regards all Materialism as having sprung from this moral and æsthetic germ. Czolbe's whole nature is essentially devoted to the ideal, and his intellectual development is ever more decidedly leading him in this direction. But this by no means deprives his exposition of Sensationalism of the interest that it possesses for us through the peculiar way in which it is carried out. Let us listen, therefore, to another passage!

"The so-called moral needs arising from dissatisfaction with our earthly life might just as properly be called immoral. It is indeed no proof of humility, but rather of arrogance and vanity, to improve upon the world we know by imagining a supersensuous world, and to wish to exalt man into a creature above nature by the addition of a supersensuous part. Yes, certainly, dissatisfaction with the world of phenomena—the deepest root of supersensuous ideas—is not a moral reason at all, but rather a moral weakness! Since, just as the moving of a machine requires the smallest exertion of strength, if we only know exactly where to apply it, so the systematic development of true principles often demands much less acumen than the development of false ones;—*thus Sensationalism does not require greater acuteness, but does require deeper and truer morality.*"[61]

Czolbe's 'System' had many incurable weaknesses, but his life was marked by a deep and genuine morality. He laboured ceaselessly at the perfection of his philosophy; and if in doing so he soon left stricter Materialism behind him, yet he remained unchangeably true to his principle

[60] Entsteh. d. Selbstbewusstseins, Leipzig, 1856, S. 52 ff.; N. D. d. Sensualism., S. 5. Comp. also Czolbe, Die Grenzen u. d. Urspr. der Menschl. Erkenntniss, Jena u. Leipzig, 1865, S. 280 ff.

[61] N. D. d. Sensualism.. S. 187 ff.

of contentment with the world that is given us, and the exclusion of everything supersensuous. The opinion that the world in its present condition is eternal, and subject only to trifling variations, and the theory that light and sound waves, which he conceives as having light and sound in themselves, propagate themselves mechanically through the nerves of sight and hearing into the brain, formed two pillars of his system, which accordingly was from no side subjected to more passionate assaults than from that of exact science. Here he showed himself obstinate, and regarded all the counter-proofs of science as mere illusions, which on further investigation would disappear.[62] There can be no doubt, therefore, that while he believed himself to be carrying the mechanical theory of nature to its extreme consequences, he was really lacking in the strict appreciation of the mechanical element.

On the other hand, he early recognised that *mechanism* in the atoms and *sensation* are two different principles, and consequently he did not hesitate to adopt into his philosophy the consequences of this recognition, since they were not at variance with his ethical principle. In a book published in 1865 on the 'Limits and Origin of Human Knowledge,' he accordingly supposes a sort of 'world-soul,' which consists of sensations that are immutably bound up with the vibrations of atoms, and that only condense themselves in the human organism, and are aggregated into the sum of the life of the soul. To these two principles he adds yet another: the organic base-forms, made up from all eternity of atomic groups, from the co-operation of which, in the mechanism of events, organisms are to be explained. We can understand that with such principles

[62] In the treatise, 'Ueber die Grenzen u. d. Ursprung der menschl. Erkenntniss,' 1865, Czolbe expresses himself as to the processes in the nerves of sensations more in accord with rational physiology (S. 210 ff.); on the other hand, the view of the immutability of the world-order, the eternal existence of our solar system, &c., still occurs (S. 129 ff.), and is attacked with a striking depreciation of the undeniable consequences of mechanics.

Czolbe could make no use of Darwin's theory. He admitted that by Darwin's principle certain modifications in the constitution of organisms are ingeniously and happily explained, but he was unable to make use of the theory of descent.

These difficulties in his standpoint, and his excessive inclination to build hypothesis upon hypothesis,[63] lessen the importance of a philosophical attempt which must excite great interest from its ethical starting-point, and the relation of his theory to its ethical foundation. Even in the 'Origin of Self-Consciousness' Czolbe says, with the frankness peculiar to him: "I can well conceive what people . . . will say; nay, it seems even to myself that I am carried, by the consequences which my principle has forced upon me, into a fairy (märchenhafte) world of ideas." With this recognition of the weaknesses of his own standpoint was combined the utmost toleration for other views. "Never," he says in the book he published in 1865, "have I shared the opinion of the best-known representatives of Materialism, that it is the force of scientific facts which compels us to the principle of the exclusion of the supersensuous. I have always been convinced that the facts of external and internal experience are very equivocal, and can be interpreted even on the supposition of another world theologically or spiritualistically, with full right, or even without any logical flaw." And again: "As Rudolf Wagner once declared that it was

[63] The doubtful character of the method inaugurated by Czolbe is easy to perceive. Good and great hypotheses contain for the most part a single assumption, which may in many cases be verified: here, on the other hand, we have a long series of hypotheses which can hardly be tested at all by experience. They do not stand alone, moreover, nor serve to explain particular cases, as often happens in natural science, but each is a necessary support of the other and for the whole system. If only one is false, then the whole system is false. If we put the probability of the truth of each single hypothesis as equal to the probability of the contrary, and therefore $= \frac{1}{2}$, then the probability of the truth of the whole system will be $\frac{1}{2^n}$, where n denotes the number of hypotheses. Upon this simple mathematical law rests the weakness of all constructions with the aid of necessary hypotheses, —though we feel this, indeed, without mathematical proof.

not physiology that drove him to assume an immaterial soul, but the idea of a moral order which was immanent in and inseparable from himself; as he assumed in the brain of those who think theologically, as a necessary condition of this idea, an organ of faith, so I openly declare that in my case too it is neither physiology nor the rational principle of the exclusion of the supernatural, but primarily the moral feeling of duty towards the natural world-order and contentment with it, that compels me to the denial of a supernatural soul." "A certain chemical and physical constitution of the brain-substance" may be more suited to the religious need, another to the atheistic. Materialism, like its opposite, springs not from knowledge and reason, but from faith and feeling.[64]

We shall abundantly see how much truth is contained in this extreme view; but here we must above all remember that it, obviously in connection with the yielding and unthorough conception of natural science which we found in Czolbe, uselessly gives up the strong side of Materialism. It deviates from the right attitude at least as much in the opposite direction as Büchner does to the side of excessive confidence and naïf confusion of what is probable and what is proved. The understanding is not so neutral in these questions as Czolbe thinks, but it leads, in fact, inductively to the highest probability of a strictly mechanical cosmology, by the side of which transcendental identity can be maintained only in a 'second world.' But, on the other hand, the assumption of an intelligible world is far from justifying every 'theological' or 'spiritualistic' interpretation of experience. Here Czolbe was only consistent in inconsistency. His aversion to Kant, whose 'intelligible world' is, in fact, quite reconcilable with all the results of natural inquiry, misled him into frequently abusing Kant, while he admitted the extremest doctrines of ecclesiastical orthodoxy as relatively justified—although these doctrines by no means content

[64] Die Grenzen u. Ursprung der Menschl. Erkentniss, S. 50, 51.

themselves with a 'second world' behind the world of phenomena, but by their dogmas often come into conflict with the most irrefutable consequences of the facts of experience.

Czolbe indirectly gained an additional interest for the history of Materialism through his lively intercourse with Ueberweg at the time when the latter was developing his Materialistic philosophy, of which we shall hereafter speak. A posthumous work of Czolbe's, which, amongst other things, is said to contain an account of Ueberweg's philosophy, is still to be expected. Czolbe died in February 1873, highly esteemed by all who knew him, and prized because of his noble efforts by men of the most opposite opinions.[65]

[65] More precise information as to Czolbe and his views is afforded in a good biographical sketch by Dr. Ed. Johnson, in the 'Altpreuss. Monatsschrift,' Bd. x., Heft 4, S. 338–352 (also reprinted, Königsberg, 1873).

SECOND SECTION.

THE NATURAL SCIENCES.

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CHAPTER I.

MATERIALISM AND SCIENTIFIC RESEARCH.

MATERIALISM always rests upon the contemplation of nature; but in our own days it cannot content itself with a possible explanation of natural events by means of its theory: it must take its stand upon scientific research, and it gladly accepts this forum, because it is convinced that here it must win its cause. Many of our Materialists go so far as to represent the philosophy to which they attach themselves as a necessary consequence of the scientific spirit—as a natural result of the enormous development and advance which the natural sciences have attained since the speculative method has been abandoned, and the exact and systematic investigation of facts has taken its place. We must not, therefore, be surprised if the opponents of Materialism eagerly seize upon any utterance of a great man of science which repudiates this supposed consequence, or even represents Materialism as a mere misinterpretation of the facts, as a fallacy of superficial inquirers, not to call them absolute triflers.

It was an utterance of this kind when Liebig, in his 'Chemical Letters,' spoke of the Materialists as 'dilettanti.' But although it may be true enough in general that the

profoundest inquirers, the discoverers and inventors, the chief masters in any special department, do not usually concern themselves with the promulgation of Materialism; and though men like Büchner, Vogt, or even Czolbe, have exhibited many deficiencies before the judgment-seat of strict method, yet we cannot give an immediate adhesion to Liebig's view.

In the first place, it is quite natural that, in our present subdivision of labour amongst specialists, the man who has directed his whole intellectual energy to the prosecution of a particular branch of science has not the inclination, and often not the capacity, to traverse the whole sphere of the physical sciences, in order to collect from every side the best-established facts of other inquirers, and to weave them into a collective whole. For him it is a thankless labour. His eminence rests upon his discoveries, and these he can only hope to make in his own special department. However much justice, therefore, there is in the demand that every scientific inquirer must possess a certain degree of general scientific training, and especially that he should know as accurately as may be the departments nearest to his own, this is only to correct some of the results of the division of labour, and not to remove the principle altogether. It may very well be, indeed, that a specialist, through his efforts to secure a general scientific culture, may attain to a definite view as to the nature of the universe, and the forces that are at work in it, without feeling the least desire to press his own view upon others, or to set it up as the only possible view. Such a reserve may be due to the best motives, for the specialist will always be conscious of a great difference between the foundations upon which his special knowledge rests and the subjective basis of whatever he may have appropriated from the results of the investigations of others.

Special studies, then, produce caution; but they also produce sometimes narrowness and arrogance. This is especially striking when such an inquirer declares his own

attitude towards the neighbour sciences as the only admissible one, when he forbids others to pronounce a judgment on the subjects of his own department, when, therefore, he absolutely rejects the necessary procedure of those who make a collective view of nature the object of their exertions. If, for example, the chemist will forbid the physiologists to say anything of chemistry, or if the physicist spurns the chemist as a 'dilettante' if he ventures a word as to the mechanism of atoms, he ought to consider whether he has really any positive justification for this arbitrary course. If he has not, if a sort of guild coins, as it were, a set of police regulations against 'dabblers' without examining their labours, such pretensions cannot be too severely condemned. But such arrogance is most pernicious when it is not a question of propounding new views, but of bringing into a new connection merely the admitted facts that have been taught us by the specialists themselves, of combining them with facts from another department into far-reaching conclusions, or of giving them a new interpretation in reference to the deriving of the phenomenon from the ultimate grounds of things. If the results of science were such that no one could interpret them but he who has discovered them—and this would be the logical result of such a pretension—it would be a sad outlook for the co-ordination of knowledge and for our whole higher culture. A shoe is in certain respects best judged by the shoemaker, in others by the wearer, and in others again by the anatomist, or by the painter and sculptor. An industrial product is judged not only by the manufacturer but also by the consumer. The man who buys a tool can often make a better use of it than the man who made it. These examples are trivial enough, but they have their application here. He who has diligently traversed the whole realm of the natural sciences in order to obtain a picture of the whole, will often see the meaning of a particular fact better than its discoverer.

We easily see, moreover, that the task of the man who seeks to gain such a collective picture of nature is essentially *philosophical*, and we may ask, therefore, whether the Materialist may not far more justly be charged with philosophical dilettanteism. This has often enough been done, but this does not help us to an unprejudiced critical appreciation of Materialism. Correctly speaking, by a dilettante we should mean one who has not gone through any thorough schooling; but what school is there for the philosopher which, on the ground of its achievements, might draw such a line between what is warranted and what is unwarranted? In the positive sciences, as in the arts, we can nowadays say what is schooling; but not in philosophy. Leaving out of account for the present the special meaning of the term when it refers to the carrying on by others of the practice of a great master, we still know well enough always what is meant by a trained historian, philologist, chemist, or statistician; but amongst 'philosophers' the term is for the most part only misapplied. Nay, the misuse of the idea itself, thoughtlessly continued, has done the utmost injury to the dignity and importance of philosophy. If we wished, independently of discipleship to a particular system, to give a general idea of philosophical training, what could it include? Above all things, a strict logical education in serious and close attention to the rules of formal logic and the bases of all modern sciences, in the doctrine of probabilities, and the theory of induction. But where in our days is such an education to be found? Hardly one university professor in ten possesses it, and least of all is it to be found amongst the "——ians," whether they call themselves after Hegel, Herbart, Trendelenburg, or any other head of a school. The second requisite would be a serious study of the positive sciences, if not to the extent of a mastery of them all in detail—which is impossible and unnecessary—yet at least in order to appreciate their present course and condition from their historical development to the extent of

thoroughly understanding their interconnection, and of understanding their methods as deduced from the principles of methodology generally. And we ask again, Where are those who have been so trained? Again, surely, amongst the "——ians" least of all. Hegel, for instance, who very lightly dispensed with the first requisite, at least endeavoured by serious intellectual exertion to satisfy the second requisite. But his 'disciples' do not study what Hegel studied; they study Hegel. And the result of this we have sufficiently seen: a hollow edifice of phrases, a philosophy of shadows, whose arrogance must disgust every one who has been trained in serious subjects. Only in the third or fourth place would come in a true philosophic training the thorough study of the history of philosophy. If, as now generally happens, this is made the first and only condition besides the adoption of some definite system, the inevitable result must be that the history of philosophy too becomes a mere playing with shadows; the formulas under which earlier thinkers tried to comprehend the world are disconnected from the scientific soil from which they grew, and so lose all their real import.

Let us leave aside, then, the charge of dilettanteism, because there is properly nothing to be opposed to it, and because precisely in the sphere of philosophy the advantage of a fresh originality often outweighs all the traditions of the schools. With regard to the exact sciences, the Materialists are justified by the philosophical tendency of their work, though, of course, only so far as they rightly appreciate facts, and confine themselves to inferences from these facts. If they venture, however much they may be driven by the connection of their system, upon conjectures which do violence to the observed facts in the empirical sciences, or if they wholly leave out of account important results of investigation, they are justly liable, as is every philosopher in like case, to the blame of specialists; but these specialists do not thereby acquire a right to treat

contemptuously all the efforts of such writers. With regard to philosophy, however, the Materialists are by no means fully justified, even though we must maintain that the reproach of dilettanteism can have no definite meaning here.

From the first, the very undertaking to construct a philosophical theory of things exclusively upon the physical sciences must in these days be described as a philosophical one-sidedness of the worst kind. By the same right by which the empirical philosopher like Büchner opposes himself to the one-sided specialist, may every thoroughly-trained philosopher in his turn oppose himself to Büchner, and reproach him with the prejudices that necessarily result from the limitation of his field of view.

Two objections, however, present themselves to this claim on the part of philosophy: the first is specifically Materialistic, the second is supported by very many representatives of the exact sciences who can by no means be numbered with the Materialists.

There is nothing outside nature is the first objection to the demand of philosophy that we should seek a wider basis. Your Metaphysic is a science falsely so called, without any sure basis; your Psychology is nothing without the physiology of the brain and nervous system; and as to Logic, our successes are the best proof that we are better placed as to the laws of thought than you with your impotent scholastic formulas. But Ethic and Æsthetic have nothing to do with the theoretical basis of philosophy, and may be constructed upon a Materialistic foundation just as well as on any other. What, under these circumstances, can the History of Philosophy do for us? It can be, from first to last, nothing but a history of human errors.

We see ourselves brought here to the question, recently become so famous, of the *limits of the knowledge of nature*, to which we must presently devote a thorough consideration. But first a few remarks on the second objection.

The philosophers, it is often said in the scientific camp,

have an *entirely different way of thinking* from ours. Any contact with philosophy, therefore, can only be hurtful to scientific research. They are simply disparate provinces, and they must remain disparate.

We pass by the question how often this view means exactly what it says, and how often, on the contrary, it is a euphemistic way of expressing the opinion that philosophy is simple nonsense. The fact remains that the doctrine of the complete difference in the way of thinking is very widely spread amongst scientific men. A very lively expression was given to it by the eminent botanist Hugo von Mohl in an address to celebrate the establishing of a scientific faculty in the University of Tübingen.[1] But the Materialists naturally do not consider themselves included in this idea of 'philosophy.' They profess to gain their ideas of the world by means of scientific thinking, and at most admit that they make a larger use of hypothesis than is admissible in special researches.

This whole way of looking at the matter rests upon a one-sided reference to our post-Kantian philosophy, with a complete misunderstanding of the character of modern philosophy from Descartes to Kant. The activity of the followers of Schelling and Hegel, of the Neo-Aristotelians, and of other recent schools, is only too well calculated to justify the repugnance with which scientific men usually turn away from philosophy; but, on the other hand, the whole principle of modern philosophy—if we do not include in that term the corruptions of German philosophical Romanticism—is entirely different. We have here, with a few exceptions not worth mentioning, a strictly scientific mode of thought with regard to everything that is given us by means of the senses; but almost as universally also an attempt to overcome by speculation the one-sidedness of the notion of the world that is thus given us.

[1] We subjoin a passage from the first edition with reference to the fact of the formation of a special scientific faculty, which has had to give up its place in the text in order to preserve a stricter consecution of ideas and to admit new material. [See Note A. at end of chapter.—Tr.]

Descartes is not so much a man of science as a mathematician. He has some serious defects, but he has in other points really advanced science, and no one will assert that he was lacking in a true scientific mode of thought. Yet he assumed, besides the corporeal world, a world also of the soul, in which everything that exists externally is only *represented;* and thus, great as are the defects inherent in his system, he touched the very point at which all Materialism must make a halt, and to which the most exact scientific inquiry at last finds itself brought.

Spinoza, the great champion of the absolute necessity of all existence and of the unity of all natural phenomena, has so often been reckoned with the Materialists, that it is almost more necessary to point out his difference than his agreement with the Materialistic view. It is, however, the same point again in which this difference appears: the whole picture of the world, to which the mechanical theory of the universe leads us, is only *one side* of the nature of things, which, of course, stands in entire harmony with the other, the intellectual side. The English philosophers ever since Bacon employ, almost without exception, a method which harmonises very well with the scientific mode of thought; and in England that conflict between philosophy and science, of which so much is heard here, has never been known. The phenomenal world is conceived by the leading English philosophers on the same principles as it is conceived by our Materialists, even though but few of them remain, like Hobbes, absolutely Materialist. But Locke, who in natural science, like Newton, assumed the doctrine of atoms, based his philosophy not upon matter, but upon subjectivity, even though in a sensationalistic sense; and he doubts whether our understanding is competent to the solution of all the problems that present themselves—a beginning of the Kantian Criticism, which receives a notable advance in the hands of Hume. There is not one of these men who did not regard it as obvious that everything in nature pro-

ceeds naturally, and the occasional concessions to ecclesiastical views are transparent enough. They are, however, with the exception of Hobbes, far from identifying the picture of the world as it is presented to our understanding and senses with the absolute nature of things, and in all the curious modifications of the systems there everywhere appears the point which distinguishes the modern philosophy from the ancient—regard to the fact that our idea of the world is essentially *representation.*

With Leibniz the idea of the world as representation is carried to an extreme in his attributing representation to the monads; and yet at the same time Leibniz, in his conception of the phenomenal world, favours the strictest mechanism, and the way in which he handles a problem of physics does not differ from the procedure of other physicists. The relation of philosophy to Materialism at length attains the utmost clearness in Kant. The man who first developed the doctrine of the origin of the heavenly bodies from the mere attraction of scattered matter, who had already recognised the main features of Darwinism, and who did not hesitate to speak in his popular lectures of the development of man from an earlier animal condition as something obvious, who rejected the question of the 'seat of the soul' as irrational, and often enough let it appear that to him body and soul are the same thing, only perceived by different organs, could not possibly have had much to learn of Materialism; for the whole philosophy of Materialism is, as it were, incorporated in the Kantian system, without changing its more idealistic character. That Kant dealt with all the objects of natural science in a scientific way there is no doubt; for the 'metaphysical principles of natural science' contain only an attempt to discover the axiomatic foundations *a priori,* and do not fall, therefore, within the sphere of empirical inquiry, which everywhere rests upon experience, and regards the axioms as given. Thus Kant leaves the whole compass of scientific thought in its place and in

its dignity, as the great and only means of extending our experience of the world given to us through our senses, of systematising it, and thus making this world intelligible to us in the causal connection of all phenomena. Were it well done then, if such a man at the same time did not rest in the scientific and mechanical theory of the world, if he asserted that this is not the end of everything, that we have reason to take the world of our ideas also into account, and that neither the phenomenal world nor the ideal world can be regarded as the absolute nature of things—were it well done to pass unsuspectingly by or to ignore the whole assertion, just because we do not feel the need for wider and deeper examination?

If it may be the specialist is afraid of being drawn away too far from his subject by the prosecution of such ideas, and if he prefers, therefore, to content himself with a few vague ideas on this head, or even to decline philosophy altogether as a foreign subject, there will not be much to say against it. But whoever, like our Materialists, comes forward as a 'philosopher,' or even thinks himself called to be an epoch-making reformer of philosophy, cannot evade these questions. To come to a thorough explanation with them is the only way in which the Materialist can claim a permanent place in the history of philosophy. Without this effort of the mind, Materialism—which, indeed, otherwise can only clothe old ideas in new material—remains for the most part nothing but a battering-ram directed against the crudest conceptions of religious tradition, and a significant symptom of a profound intellectual ferment.[2]

[2] Büchner has written a 'Criticism of Himself' on the occasion of the twelfth edition of 'Force and Matter' (in the third edition of 'Natur u. Wissenschaft,' Leipz., 1874), in which he regards it as a chief merit of his to have helped *philosophy* to vindicate her claims in the sphere of the natural sciences. He admits that other circumstances have contributed to this, but "it was 'Force and Matter' that paved the way and opened the contest in such a manner that it secured the universal sympathy of learned and unlearned, and could not be laid again to rest without a definite result. In this sense, then, 'Force and Matter' may, and indeed must,

It is, however, remarkable that the very point which the systematisers and apostles of the mechanical cosmology so carelessly pass by—the question as to the *limits of natural knowledge* has found full appreciation amongst deep-thinking men engaged in special researches. Thus it is shown that genuine and thorough special studies, in combination with solid general culture, easily lead to a deeper insight into the essence of nature than a mere encyclopædic excursion through the whole realm of physical research. The man who is securely master of a single field, and here sees into the heart of every problem, has won a sharpened eye for all related fields of inquiry. He will everywhere easily find his way, and so, too, will quickly attain to a general view, which may be described as genuinely philosophical, while studies which are wider in their reach may easily retain that lack of thoroughness which marks every philosophical system that evades the questions belonging to the theory of knowledge. And therefore it deserves also to be specially observed, that the most eminent of our scientific men who have ventured to

be called 'epoch-making,' and the book must be always regarded in the history of science so long as such a history exists." But Büchner might much more claim a permanent mention of his name in the general history of intellectual development, on the ground that he was the man who trumpeted abroad with striking success at the right moment what many were thinking, a thing which assuredly many, as well from the scientific as the philosophical side, could have done better. Whether more successfully, too, is another question, since his very lack of scientific precision and his dallying with the superficial aspect of phenomena were very essential to Büchner's success. When Büchner attributes scientific importance to his 'theory,' he certainly deceives himself, since neither in general nor in detail does he contribute anything essentially new, but, in fact, often falls considerably short of the requirements of his task, viz., to present a general view of the mechanical theory of the world. Thus, for instance, Büchner, in his 'Criticism of Himself,' represents the doctrine of the persistence of force as a subsequent and confirmatory complement of his standpoint, since he dates it very naïvely from the fifth edition of his book, although every thorough man of science and philosophy *must* have been acquainted with this important doctrine as early as 1855, when the first edition of 'Force and Matter' appeared. Why, Mayer had announced the law in 1842; in 1847 came Helmholtz's 'Abhandlung von der Erhaltung der Kraft;' and in 1854 the same physicist's *popular* essay, 'Ueber die Wechselwirkung der Naturkräfte,' was in a *second* edition!

enter the domain of philosophy, nearly all, from whatever starting-point, have come upon the problems of the theory of knowledge.

Let us first consider the much-discussed lecture, 'On the Limits of the Knowledge of Nature,' which Du Bois-Reymond delivered at the meeting of the German Scientific and Medical Association at Leipzig in 1872. The lecture itself, as well as sundry answers to it, will give us abundant opportunity to exhibit in the clearest light the salient point in the whole criticism of Materialism.

All knowledge of nature has its ultimate aim in the mechanism of atoms. Accordingly, Du Bois-Reymond sets up as an extreme, to the human mind unattainable, but still intelligible, goal, a complete knowledge of this mechanism. Starting from an expression of Laplace's he teaches that "a mind which should know for a given very small period of time the position and movement of all the atoms in the universe, would also necessarily be in a position to derive from these, in accordance with the laws of mechanics, the whole past and future. It could, by an appropriate treatment of its world-formula, tell us who was the Iron Mask, or how the 'President' came to grief. As the astronomer predicts the day on which, after many years, a comet again appears in the vault of heaven from the depths of space, so this 'mind' would read in its equations the day when the Greek cross will glitter from the mosque of Sophia, or when England will burn its last lump of coal. If put down in the world-formula $t = -\infty$, the riddle of the original condition of things would solve itself to it. It would see in endless space matter either already moved or unequally distributed, since, if it were equally distributed, the equilibrium would never have been disturbed. If it let t increase indefinitely in the positive sense, it would learn whether it is after an infinite or finite period that Carnot's principle threatens the universe with icy cessation." All qualities arise first through the senses. "The Mosaic 'there was light' is physiolo-

gically false. Light first was when the first red eye-point of an infusorium for the first time distinguished between light and dark." "Dumb and dark in itself, that is, without qualities, as it appears from a subjective analysis, is the world also for the mechanical theory resulting from objective inquiry, which, instead of light and sound, knows only vibrations of a primitive substance devoid of qualities, which has become matter that may here be weighed, and there not."

There are now two places where even the mind imagined by Laplace would have to halt. We are not in a position to conceive the atoms, and we are unable, from the atoms and their motion, to explain the slightest phenomenon of consciousness.

We may turn and twist the notion of matter as we like, we always come upon an ultimate something that is incomprehensible, if not absolutely contradictory, as in the hypothesis of forces that act at a distance through empty space. There is no hope of ever solving this problem; the hindrance is transcendental. It rests upon the fact that we can in fine conceive of nothing without any sense qualities, while, at the same time, our whole knowledge is directed towards resolving the qualities into mathematical relations. Not without justice, therefore, Du Bois-Reymond goes on to mention that all our knowledge of nature is, in truth, no knowledge at all, that it affords us merely the substitute for an explanation. We shall never forget that our whole culture rests upon this 'substitute,' which in many important respects perfectly replaces the hypothetical absolute knowledge; but it remains strictly true that the knowledge of nature, if we follow it to this point, and try to press farther on with the same principle that has brought us so far, reveals to us its own inadequacy, and sets a limit to itself.

Du Bois-Reymond finds no serious difficulty for the knowledge of nature in the origin of organisms. Where and in what shape life first appeared we do not know, but

the mind that Laplace imagined in possession of the world-formula could tell us. Crystal and organism differ from each other as a mere building differs from a factory with its engines and machinery, into which raw material pours, and from which manufactures, waste materials, and refuse pour out again. We have here nothing more than an "extremely difficult mechanical problem." The richest nature-picture of a tropical forest offers to analysing science nothing but matter in motion.

Not here, accordingly, is the second limit of natural knowledge, but at the first appearance of *consciousness*. And it is by no means a question of the human mind in the whole extent of its imaginative and rational powers. "As the most powerful and complicated muscular effort of a man or animal is not essentially more obscure than the simple contraction of a single muscular fibre; as the single secreting-cell conceals the whole problem of secretion, so, too, the loftiest activity of the soul from material conditions is not in the main point more incomprehensible than consciousness in its first stage of sensation. With the first emotion of pleasure or pain that the simplest creature experienced in the beginning of animal life upon earth, this impassable gulf is established, and the world has become henceforth doubly incomprehensible."

Du Bois-Reymond proposes to prove this, independently of all philosophical theories, in a manner that is evident even to the scientific mind. For this purpose he supposes that we have a complete ('astronomical') knowledge of the processes in the brain, and that not of the unconscious processes only, but also of those which, in point of time, coincide always with the intellectual processes, and are therefore, it is probable, necessarily bound up with them. Then, of course, it would be a lofty triumph "if we could say that in a particular intellectual process a particular movement of particular atoms took place in particular ganglionic centres and nervous tubes." The "unveiled insight into the material conditions of intellectual pro-

cesses" would edify us more than any scientific discovery yet made, but the intellectual processes themselves would be just as incomprehensible to us as now. "The astronomical knowledge of the brain, the highest knowledge we can attain, reveals to us nothing but matter in motion." But if we suppose that from this knowledge certain intellectual processes or dispositions, as memory, the association of ideas, and so on, might become intelligible, that too is delusion; we only learn certain conditions of intellectual life, but do not learn how the intellectual life is itself developed from these conditions.

"What conceivable connection exists between certain movements of certain atoms in my brain on the one hand, and on the other the to me original and not further definable but undeniable facts, 'I feel pain, feel pleasure; I take something sweet, smell roses, hear organ-sounds, see something red,' and the just as immediately resulting certainty, 'therefore I am'? . . . It is impossible to see how from the co-operation of the atoms consciousness can result. Even if I were to attribute consciousness to the atoms, that would neither explain consciousness in general, nor would that in any way help us to understand the unitary consciousness of the individual."

This second limitation of natural knowledge also Du Bois-Reymond calls an absolute one: no conceivable progress in the sciences can ever help us to get over it. But all the less will the man of science be deprived of the right, unconfused by myths, dogmas, and philosophical systems puffed up by their antiquity, to form inductively his own opinion as to the "relations between spirit and matter."

"He sees in a thousand cases that material conditions influence the intellectual life. To his unprejudiced eye there appears no ground to doubt that really the sense-impressions communicate themselves to what is called the soul. He sees the human mind, as it were, grow with the brain. . . . No theological prejudice prevents him from recognising, with Descartes, in the souls of animals the

members of the same order of development successively less and less perfect, but still related to the soul of man." He sees how in the vertebrates those portions of the brain which physiology must regard as bearers of the higher intellectual functions gradually develop themselves with the advance of the activities of the soul. "Finally, the evolution theory in connection with the doctrine of natural selection forces upon him the idea that the soul has arisen as the gradual result of certain material combinations, and perhaps, like other hereditary endowments that are useful to the individual in the struggle for existence, has advanced and perfected itself through an innumerable series of generations."

We must almost believe that Materialism might be very well content. By way of supererogation, Du Bois-Reymond expressly takes under his protection Vogt's notorious expression, that the thoughts bear the same relation to the brain as the gall to the liver, or urine to the kidneys.[3] Physiology knows nothing of æsthetic distinctions. To it the secretion of the kidneys is an object of the same dignity as the functions of the nobler organs. "It is scarcely blameworthy either in Vogt's saying that the activity of the soul is represented as a product of material conditions in the brain." The only defect is in the creating the idea that the activity of the soul may be as intelligibly explained from the structure of the brain, as the secretion from the structure of the gland.

But this it is, of course, against which Materialism revolts. If anything at all remains 'unintelligible,' Materialism may still be an excellent maxim of scientific research (and that we too agree in thinking it), but it is no longer philosophy. Other systems, such as Scepticism, may adopt the unintelligible element, or even make the

[3] It may be added here that the much-discussed 'expression of Vogt' is substantially already in Cabanis. The brain produces "la sécrétion de la pensée": Rapports du Physique et du Moral de l'Homme, Par. 1844, p. 138. The editor, L. Peisse, remarks on it: "Cette phrase est restée célèbre."

unintelligibleness of things their very principle; but Materialism is essentially a positive philosophy, which asserts its fundamental doctrines with dogmatic certainty, and one of whose most important assertions it is that by means of these doctrines the whole world may easily be understood. And however much our modern Materialists are inclined to sceptical and relativistic fits, however easily they may talk perhaps of the unintelligibleness of the ultimate grounds of all existence, or set up the world of man as the world of inquiry, while giving up the question whether there may be another way of conceiving things, the unintelligibleness of the intellectual element they will not concede, because they find one of the greatest achievements of Materialism in this, that even the activities of the soul in man and animals are thoroughly explained out of the functions of matter.

That in this is involved a serious misunderstanding must have already been made sufficiently clear in our first book. But we are nowhere more directly confronted with it than in the polemic which was directed in the Materialistic interests against Du Bois-Reymond. We may indeed say of his opponents what Kant said of Hume's (cf. *ante* p. 206), that "they always assumed as conceded precisely what he doubted, and, on the contrary, demonstrated with eagerness and often with arrogance what he never thought of disputing."

This is most striking in the case of Dr. Langwieser, a specialist in brain diseases, who has discussed Du Bois-Reymond's 'Limits of Natural Knowledge' in a small pamphlet published at Vienna, 1873. Langwieser had already written in 1871 a 'Versuch einer Mechanik der Psychischen Zustände,' which offers some noteworthy, if somewhat crudely developed, contributions to a future understanding of the functions of the brain. That the author overestimates the range of his explanations is very natural, and that he believes that from his standpoint, through the proof of mechanical brain-functions, he has

also explained consciousness, is a feature which he shares with Materialism generally. One would suppose that such a writer, when an inquirer like Du Bois-Reymond comes forward, would at least awake out of "dogmatic slumber," and would see clearly what was the real point at issue; but instead of this we have entire misapprehension. Nor would the misapprehension of an individual writer long detain us, but that we seem to have here, as it were, the classical model of a whole class of similar misapprehensions, and that this very point is of the highest importance for the appreciation of Materialism.

The misapprehension is so gross that Langwieser actually asserts that Du Bois-Reymond contradicts himself in assuming Laplace's principle of the calculation of the future from a perfect formula of the universe. "In order to calculate by means of the mechanism of the atoms events of the past or future in which the human mind has co-operated or will co-operate as an essential factor, the intellectual circumstances of humanity fall also within the province of the knowable atomic mechanism, which is just what Du Bois-Reymond denies." . . . "But if he would answer that Laplace's 'mind' would be cognisant also of the atomic movements of all human brains, and would take them into account, so that it would calculate also the influence of the intellectual processes of man upon material events, only that the understanding of the intellectual processes from these atomic movements would be forbidden him, this again involves a contradiction. For so soon as he can calculate every idea as an atomic movement, with its further consequences and effects, then he knows from its effects also the nature of the thing, as everywhere else, so also in the sphere of intellectual things; for the nature of a thing is nothing more or less than so far (*sic*) as it expresses itself in its effects."

Here, therefore, we have a case in point where the opponent assumes as admitted and obvious just what Du Bois-Reymond doubts; and the remainder of the pamphlet

is devoted to proving what the celebrated physiologist has never doubted, and to the elucidation of which he has himself made the most valuable contributions.

An unprejudiced reader of the lecture on the 'Limits of Natural Knowledge,' if he be provided with the necessary knowledge, can never for a moment doubt that the author amongst the atoms includes also the brain-atoms of man, and that for him man, together with his 'voluntary' actions, is to the student of science but a part of the universe, similar in all respects to the other parts. But Du Bois-Reymond would, at the same time, be careful not to speak of this "influence of intellectual processes upon material events," because such an influence, strictly speaking, is scientifically quite inconceivable. Were it possible for a single cerebral atom to be moved by 'thought' only so much as the millionth of a millimetre out of the path assigned to it by the laws of mechanics, the whole 'world-formula' would become inapplicable and unmeaning. But human actions, even, *e.g.*, those of the soldiers destined to plant the cross upon the mosque of Sophia, of their generals, the diplomatists concerned, and so on—all these actions result, scientifically speaking, not from 'thoughts,' but from muscular movements, whether these serve to make a march, to draw a sword or guide a pen, to give utterance to the word of command, or to fix the eye upon a point of attack. The muscular movements are set free by nervous activity; this arises from the functions of the brain, and these are entirely determined by the structure of the brain, by the sensory conductors and by the atomic movements of molecular changes and so on, under the influence of the centripetal nervous activity. We must quite realise that the law of the conservation of energy can undergo no exception in the interior of the brain without becoming wholly meaningless, and we must rise to the conclusion therefore that the whole activity of man, individuals as well as peoples, might go on, as it actually does go on, without the occurring in any single individual

of anything resembling a thought or a sensation. The glance of man might be just as 'full of soul,' the sound of his voice just as 'moving,' only that there would be no soul answering to this phrase, and that no one would be 'moved' in any other way than that the unconsciously changing looks would assume a gentler expression, or the mechanism of the cerebral atoms would bring a smile upon the lips or tears into the eyes. Thus, and in no other way, did Descartes conceive the animal world, and there is not the slightest room to question the scientific admissibility of such a supposition. That it is false we only infer from the similarity in the symptoms of animal sensations with those which we observe in ourselves. But in the same way it is only by an inference from analogy that we attribute consciousness to any other people than ourselves. We find it connected in ourselves with corporeal processes, and we justly conclude that it will be so also in the case of others; but scientifically we can know nothing whatever but the symptoms and 'conditions' of the intellectual element outside us, and not this element itself. We may give the sharpest, and I might say the clearest and most convincing, expression to the view from which Du Bois-Reymond starts, if we suppose two worlds, both occupied by men and their doings, with the same course of history, with the same modes of expression by gesture, the same sounds of voice for him who could *hear* them, *i.e.*, not simply conduct their vibrations through the auditory nerve to the brain, but be conscious of them to himself. The two worlds are therefore to be absolutely alike, with only this difference, that in the one the whole mechanism runs down like that of an automaton, without anything being felt or thought, whilst the other is just *our* world; then the formula for these two worlds would be entirely the same. To the eye of exact research they would be indistinguishable.

That we do not believe in the one of these worlds is nothing but the immediate effect of our peculiar personal

consciousness, as each of us knows it in himself alone, and which we attribute also to everything that is externally like ourselves. But the fusion between the apprehension of the external symptoms of mind and their interpretation from our own consciousness is so complete, and so deeply rooted from our birth, that it requires an acute and unprejudiced thinker to separate these two factors.

But it is quite a different question when we come to the causal connection between material processes and the intellectual states combined with them. That in this respect the fullest independence of the intellectual and the physical may be asserted without trespassing beyond the 'limits of natural knowledge' is expressly recognised by Du Bois-Reymond; and so far, then, as the Materialists are concerned merely to get rid of supernatural notions and events, they need not be troubled by the doctrine set forth. Du Bois-Reymond, at the utmost, propounds as possible and even probable what they themselves maintain with dogmatic certainty; nay, Laplace's idea, as Langwieser has quite rightly discovered, contains more than the mere possibility. However puzzling may seem the way in which the intellectual and the physical are connected, however inexplicable may be the nature of the latter, yet the absolute dependence of the intellectual on the physical must be asserted, so soon as it is shown, on the one hand, that the two sets of phenomena entirely correspond, and, on the other, that the physical events follow strict and immutable laws, which are merely an expression of the functions of matter. What changes a more thorough examination may produce in this view we shall find out further on.

In the same way as the Materialists, so too have their antipodes, the theologians and theologising philosophers, understood the doctrine of the limits of natural knowledge. They look away past the grossly Materialistic character of the views which Du Bois-Reymond develops, and cling to the one great fact, that he sets absolute and

impassable limits to scientific research. Force and matter are inexplicable, atomistic knowledge is only a 'substitute' for real knowledge; and therefore Materialism is rejected —rejected by one of our first scientific men. Why, then, may not speculation and theology again cheerfully luxuriate over the abandoned field, and teach with great authority what science does not know? That they do not know it themselves has nothing to do with the question. The celebrated physiologist has declared consciousness—nay, even the simplest sensation—as inaccessible to scientific research; why, then, may not the old metaphysic and the old wise psychology of notions rummage out their dolls again and set them dancing on the vacant field? The old bugbear is gone; the man of science, who only teaches what he knows, has promised to let the game alone; so then we are in merry possession again of our domains! Everything will now go on as if there were no such thing as science. The sphere of mind has nothing to do with science!

That such misapprehensions are possible can only be due partly to the deeply-rooted habit of not clearly defining the idea of knowledge, and of identifying understanding with the investigation of causal connection. Partly, indeed, the fault must rest with the lecturer, although less for what he says than for what he does not say; and finally, with the way in which a fragment from the criticism of all knowledge is torn out, and without sufficient indications of its connection with further questions is flung amongst the public. In this respect, the writer himself may not have fully appreciated the position, although he shows himself otherwise not unversed in the history of philosophy. A deeper indication we find only towards the end of the discourse: Du Bois-Reymond here raises the question whether the two limits of natural knowledge may not perhaps be the same, "*i.e.*, whether, if we understood the nature of matter and force, we should not also understand how the substance underlying them can, under certain

conditions, feel, will, and think." This again is quite a Materialistic turn, instead of which the disciple of the Critical Philosophy would rather ask, whether, if we had fully understood the relation of consciousness to the way in which we conceive natural objects, it would not at once be perfectly clear to us, why we must in scientific thought represent the substance of the world as matter and force? That the two problems are identical is, in fact, much more than probable. And in the last result it would come to the same thing, whether the latter is resolved into the former or conversely; and yet the one method of reduction is in its tendency Materialistic, and the other Idealistic. The solution supposed would, of course, if it were at all possible, do away with the antithesis between Materialism and Idealism.

There is a single passage in this carefully thought-out discourse which is not only liable to misunderstanding, but is positively incorrect; we will proceed therefore to make some critical remarks upon it. In the world in motion of Laplace's imaginary Mind, the cerebral atoms also move * "as in dumb play." And then he proceeds: "It surveys their hosts, it penetrates their complications, but it *understands not their gestures;* to it they do not think, and therefore its world remains without qualities."

Let us recollect, in the first place, that this Mind contemplates even human actions as necessary consequences of the movements of the cerebral atoms! Let us recollect that the law of necessity, the keys of which this Mind possesses, rules all, even the subtlest and most significant movements of glance, of look, the modulation of the voice, and that the way in which men associate and affect each other in hate and love, in jest and disputation, in struggle and labour, must at least, from the external aspect, be perfectly intelligible to this Mind. It can predict the slightest shadow of secret envy or tacit intelligence in a

* [S. 28; 4te Aufl., S. 32, where the phrase is altered to meet Lange's criticism.—Tr.]

human glance just as well as a total eclipse of the moon. But let us further recollect that this Mind was supposed to be a mind *related to man*, that it is accordingly itself capable of all these emotions which its formulæ express. *Can it, then, fail to read its own sensations into what it sees externally before itself?* We do just the same thing when we perceive envy, anger, gratitude, or love in our fellow-men. We, too, perceive only the tokens, and interpret them from our own hearts. This Mind, indeed, has primarily only its formulæ, while we have immediate intuition. But we need only lend it a little fancy, a quite intelligible fancy, such as we ourselves possess, and it will at once transform its formulæ into intuition.

Of course, at first, those formulæ only speak to it that express the external phenomenon, which we, too, know from daily life; but if it completely observes the causal connection of this external phenomenon with the motion of the cerebral atoms, it will very soon read in the latter its causes and effects, and it will then understand 'the gestures' of these atoms from their influence upon the external gestures of the man just as much as, *e.g.*, the telegraph-clerk with a little practice works the messages immediately from the rhythm of the clicking lever, without being obliged first to read the signs impressed upon the paper.

If now this Mind, besides all its other magnified human qualities, possessed too a high degree of critical acumen, it would see that it perceives the intellectual life, not by means of objective knowledge, in daily life as little as in science, but that it carries it over from its own internal experience in the one case into formulæ, in the other into intuitions. It would also readily admit that no immediate knowledge of foreign sensations is given it, and that it has no idea at all how sensation and consciousness arise from material movements. In these respects it would calmly join Du Bois-Reymond in his 'Ignorabimus;' but at the same time it be would the *most perfect psychologist* that we can possibly conceive, and psychology,

as a science, can never be to us anything but a fragment of the knowledge which this Mind possesses in all its fulness.

But if we look at the matter carefully, it is the same with all sciences without exception, so far as we have not to do with the appearance of knowledge. Everything is, in a certain sense, natural knowledge, for all our knowledge is directed towards *intuition*. It is only in the object that our knowledge takes its bearings through the discovery of fixed laws; it is from the subject that we interpret and give life to the different forms, so far as we refer them to the intellect. Immediate knowledge of the intellectual element we have only in our own self-consciousness; but whoever tries to spin a science out of this alone, without being guided by the object, falls irredeemably a victim to self-delusion.

If, then, this is so, what is the value of the demonstration of the limits of natural knowledge? However much the methodological character of the so-called 'mental sciences' differs from that of the natural sciences, they are nevertheless all included in Du Bois-Reymond's ideal of the natural sciences, so far, that is, as they rest upon real knowledge, and not upon mere imagination.[4] It might be

[4] The distinction between the 'mental' and the 'natural sciences' is very sharply emphasised by Mill in his 'Logic.' He requires for the former, indeed, essentially the same method of inquiry, but, on the other hand, he greatly over-values (hence the standpoint of the English Association-Psychology) the source of subjective observation, which he considers almost exclusively, while he underestimates the advancement of these sciences by the help of the corresponding phenomenon—the physiological method. Helmholtz appreciates the distinction more correctly in his lecture 'On the Relation of Natural Science to General Science' (Popular Lect., E. T., p. 16 ff.). Hence the distinction which results from the difference of the subject-matter, method and modes of proof, comes to the front. When Helmholtz at the same time demands for the historian, the philologist, the jurist, &c., "a delicately and fully-trained insight into the springs of human action," which rests again upon "a certain warmth of sympathy and an interest in observing the workings of other men's minds," this must be conceded. They are just the means by which we may more finely and rapidly apprehend and more correctly interpret the *signs* in words, writing, gestures, traces and monuments of all kinds *that are open to external observation*. The mind imagined by Laplace, however, needs in this respect not an exceptional but only an ordinary human capacity, in order to possess the fullest insight in the mental sciences too, so far as he can follow them up

supposed that this decided the triumph of Materialism, and that the thanks which its opponents have offered for the bold 'confession' of the famous physiologist are absolutely objectless. But if we recall what has been said in the chapter on Kant we shall easily see that this is not so. The 'limits of natural knowledge' are, ideally speaking, identical with the limits of knowledge in general; but this very circumstance increases their importance, and the whole inquiry becomes a confirmation from the scientific side of the critical standpoint in the theory of knowledge.

The limit of knowledge is, in truth, no rigid barrier which absolutely opposes itself at a certain point to its natural course of progress. The mechanical theory of the world has before and behind an infinite task, but as a whole it essentially carries within itself a limit which it will never be able to escape at any point of its course. Does the physicist explain red light when he shows us the number of vibrations that correspond with it? He explains so much of the phenomenon as he can, and the rest he leaves to the physiologist. The latter, again, explains what he can; but even if we credit his science with a perfection which it does not at present possess, he too has in fine, like the physicist, nothing but atomic movements at his disposition.[5] In his case the arch is completed by the

with his feelings; for he possesses in his knowledge of the external facts a means of controlling and improving the principles of interpretation of signs, and as at the same time he understands every language (for his world-formula contains all the facts of the development and modification of all significant sound), he knows, too, how any human mind, from the ablest to the poorest, interprets the signs of the intellectual facts. A poet, indeed, for all his infinite knowledge, he could not become, unless it were otherwise in him to be so.

[5] The demand made by Kirchmann, Czolbe, Spiller, &c., that the qualities which, since Locke, and at bottom since Demokritos, are regarded as "secondary" and merely subjective, must have an objective reality, rests, indeed, in the first place, upon an inadequate theory of knowledge, and in so far that 'red,' 'sour taste,' 'bell-ringing,' &c., are phenomena in the subject, cannot be shaken. But if natural knowledge gives me, *even in the brain*, only *atomic movements* as the corresponding facts, while sensations are undoubtedly present (have empirical reality), I can very easily base the conjecture that in the vibrating string, too, there is something else, that is not, indeed, like my idea of the sounding, coloured objects, but yet has far more relationship with them than the undulating atom.

resolution of centripetal into centrifugal nervous currents. The rest, then, he cannot hand on any further, and he proclaims the 'limit of natural knowledge.' But is the chasm in this case different from that in the case of the physicist, or have we any guarantee that his vibrations also, like those of the physiologist, are not necessarily combined with a process of an entirely different nature? Is it not a very natural and quite justifiable conclusion from analogy that there is *everywhere* behind these vibrations something concealed? Behind the vibrations in the brain hide our own sensations; we can, therefore, *fix* the 'limit of natural knowledge' at this point; but that it *lies only here*, and not rather in the character of knowledge itself, must, at least on a little reflection, appear very improbable.

And it is not without reason that this is a point from which the most various speculations take their start. Du Bois-Reymond dispels the idea of a 'world-soul' by pointing out that we do not find in the structure of the world any analogy with the structure of a human brain.* The argument is strong enough against anthropomorphic conceptions of such a world-soul, but not against the idea in a more general form. Other conceptions, such as, *e.g.*, Schopenhauer's identification of will and motive impulse, the 'world-æther,' with which Spiller[6] takes the field against Du Bois-Reymond, Ueberweg's sensient matter, and so on, may be easily shown to be transcendental speculations; but the ground from which these speculations spring remains, and negatively we may answer with confidence, that of the dead, dumb, and silent world of the vibrating atoms we know nothing, but that it is to us a necessary conception, in so far as we try to represent scientifically the causal connection of phenomena. As, however, we have seen that this necessary conception ex-

* S. 32; 4te Aufl., S. 38.

[6] Spiller, Das Naturerkennen nach seinen angeblichen u. wirklichen Grenzen, Berlin, 1873. This treatise, too, as against Du Bois-Reymond, is full of misapprehensions of the kind denoted in the text.

plains not what is given, namely, our sensations, but only a certain order in their origin and decay, so we must see that this conception, in its whole nature and its necessary principles, is not calculated to reveal to us the ultimate, innermost nature of things.

We reach exactly the same result if we start from matter and force. Here it is easy to show that theoretical physics has, from any point of view, a whole infinity of subtler and ever subtler explanations and mathematical analyses before it, while the difficulty that opposes itself to knowledge always remains the same. So soon, however, as we come back to the atoms, we find everywhere traces of the inadequacy of the mechanical conception. As is well known, Hume tried (cf. *ante*, p. 160) to remove the objections to a Materialistic explanation of thought, by professing to find the same incomprehensibleness in all other cases of a causal relation. In this he was right; but the protection that he thus extends to Materialism in one respect in another serves to its destruction. The contradictions cannot attach to the 'thing in itself;' they must therefore have their root in our modes of thought.

If consciousness and brain-movement coincide, without our being able to understand how the one could act upon the other, we can hardly avoid the old Spinozistic idea, which finds an echo too in Kant, that both are the same thing—projected, as it were, upon different organs of apprehension. Materialism clings so obstinately to the reality of matter and its motion, that a genuine dogmatist of this school does not long hesitate to declare the brain-motion to be the real and objective fact, and the sensation merely a sort of appearance or a delusive reflex of objectivity. But it is not only 'appearance' that 'deceives:' the *idea of appearance* also has often proved deceitful. The ancient philosophers especially were very naïf in their belief that they had disposed of a thing when they explained it to be 'appearance;' as if the notion of appearance were not a relative one! A ray of light, a

streak of cloud, *appears* to be a form, but the light and the cloud are still real. If, for instance, motion is explained to be appearance, we may have a reason for regarding the thing in itself as eternally resting; but the apparent motion contradicts this judgment. It is an absolutely given fact, like the light or cloud-streak.

Such must be our judgment of the Materialistic treatment of sensation if the brain-motion is to be exalted to its real essence. This standpoint is very distinctly represented by Langwieser, for instance, in his polemic against Du Bois-Reymond. "Little as our self-consciousness," he says,* "teaches us the anatomy of our body, or at least the fibrous structure of our brain, and little therefore as there is *any such thing as self-consciousness in an objective sense*, we are just as little able *subjectively to know our sensations for what they are.*"

Here we see how the old naïf view of sense impressions is yet further strengthened by the introduction of the modern ideas of 'objective' and 'subjective.' The subjective is, strictly speaking, nothing; or, in other words, subjective existence is not the true, proper existence, with which alone science is concerned. Our own consciousness —the starting-point of all thought with philosophers since Descartes—is only such a subjective phenomenon. When we know the organs of the brain in which it arises, and the currents stirring in these organs, then only do we know what the thing is: we have observed consciousness 'objectively,' and then everything is done that can reasonably be required.

To these conceptions of a Materialistic natural philosopher who despises philosophy as "Mysticism," we will now oppose the opinion of a philosophically trained scientific man. The astronomer Zöllner shows, in his remarkable and important book 'On the Nature of Comets,' that we only attain to the conception of an object at all through sensation. Sensations are the *material* out of which the

* S. 12.

world of external things constructs itself. The very simplest kind of sensations that we can conceive already includes, so soon as we imagine a connection in the changing sensations in an organism, the conception of time and of causality. "From this it seems to me to result," concludes Zöllner, "that the phenomenon of sensation is a much more fundamental fact of observation than the motion of matter, which we are obliged to attribute to it as the most universal quality and condition of the intelligibleness of sensuous changes."[7]

In fact, the notion of atoms and their motion may be derived from sensation, but not conversely sensation from atomic motions. We might then attempt to start *from sensation*, and so break down the barrier of natural knowledge, and thus, as it were, make all natural science the special province of psychology; but such a psychology, as we shall see further on, has not the means within itself to become an exact science. Only when we resolve our sensations and ideas of sensation in abstraction into those simplest elements of extension in space, of resistance and of movement, do we obtain a basis for the operations of science. In so far as in these most abstract representations of sensible things there appears a necessary agreement of all men in virtue of the *a priori* elements of our knowledge, so far indeed these representations are 'objective,' as opposed to the more concrete sensations combined with pain and pleasure which we call 'subjective,' because in these our subject does not find itself in a universal and necessary agreement with all other subjects that experience sensations. At the same time everything is at bottom in the subject, just as 'object' originally means nothing more than the object of our conception. The sensation and the representation of sensation is the universal; the representation of atoms and their vibrations the particular case. The sensation is *actual* and *given;* but in the atoms nothing

[7] Zöllner, Ueber die Natur der Kometen: Beiträge z. Geschichte u. Theorie d. Erkenntniss, 2 Aufl., Leipzig, 1872, S. 320 ff.

is at bottom given except the remains of faded sensations, by means of which we create the image of them. The idea that something external, absolutely independent of our 'subject,' corresponds to this image, may be very natural, but is not absolutely necessary and conclusive; otherwise there could never have existed Idealists like Berkeley.

If, therefore, of the two objects—sensation and atomic movement—one must be taken as reality, the other as mere appearance, there would be much more reason to take sensation and consciousness as real, and the atoms and their movements as mere appearance. That we construct natural science upon this appearance cannot make any difference. Natural knowledge would then be only an analogon of true knowledge—a means of enabling us to find our way, like a map which renders us excellent service, although it is very far removed from being the country itself in which we are travelling in idea.

But such a distinction is neither necessary nor desirable. Sensation and atomic movement are for us just as 'real' as phenomena, although the former is an immediate phenomenon, atomic movement only a mediate one through thought. Because of the strict connection which the assumption of matter and its motion creates in our conceptions, it deserves to be called 'objective;' for only by its means does the manifoldness of objects first become one great comprehensive 'Object,' which we oppose as the permanent 'object' of our thought to the changing content of the Ego. This whole reality, however, is simply empirical reality, harmonising very easily with transcendental ideality.

From the standpoint of the critical philosophy which bases itself on the theory of knowledge, all need disappears of breaking through the 'limits of natural knowledge' we have been discussing, since these limits are not a foreign and hostile power, but are our own peculiar nature. If, however, we would still make another last attempt to get

rid of the appearance of an irreconcilable dualism in a more popular way, there presents itself the method struck out by Zöllner, *to attribute sensation to matter in itself*, and to conceive the mechanical processes as regularly and universally connected with the processes of sensation. But we must never forget that the explanation thus attained is not a scientific, but a speculative one, and that the real problem, the unintelligible element in the phenomenon, is not disposed of, but merely postponed. In order to possess scientific value, this theory would have to prove the origin of human sensation from the sense-processes of the self-moving particles, at least as strictly as the building up of the body out of cells, or the passage of mechanical motion from the outer world into the condition of our nervous system. Two problems would still remain: the notion of *force and matter* would be burdened with all the old difficulties, and with a new and greater one besides. Consciousness, again, would indeed have a link to connect it with matter, but its *unity* in its relation to the *multiplicity of the constituent sensations* would at bottom still present the same incomprehensibleness as before did the relation of consciousness to the vibrations of the atoms of the brain.

Moreover, it is still very questionable whether, if such a theory could ever be carried out, it would not end by dropping the atoms and their vibrations altogether, like a scaffolding when the building is completed. The world of sensation—the only world given—would, in fact, be explained out of its own elements, and would no longer need the extraneous support. But if there were any sufficient reason to retain also the conception of atoms, then the material world would still be a world of representation; and the conjecture that behind the two corresponding worlds—the material world and the world of sensation—there lies an *unknown third thing* as their common cause, would carry us deeper than the simple identification of the two.

Thus we see how in fact thorough scientific investiga-

tion through its own consequences carries us beyond Materialism. This is however always the case in this one point only, where we are compelled to conceive the universe of science as a phenomenal world, by the side of which the phenomena of mental life, despite their apparent dependence upon matter, remain essentially something foreign and different. We may, starting from other premises, as especially from the physiology of the sense-organs, attain to the same limit of natural knowledge; but we cannot find any point unconnected with the whole mechanical theory of things in which, by pushing material inquiries further, their inaccuracy could be proved. Whatever other reproaches have been made, as it were, from the judgment-seat of scientific thoroughness against the 'dilettanteism' of the Materialists, are either unsound or they touch not the essence of Materialism, but merely some chance expression of one of its adherents.

This applies especially, too, to some of the attacks which Liebig in his 'Chemical Letters' undertakes against the Materialists. Thus, *e.g.*, when he says in his 23d Letter, "*Exact inquiry has proved* that at a certain period the earth possessed a temperature which was incompatible with organic life; for coagulation of the blood takes place at 78° C. *It has proved that organic life upon earth had a beginning.* These are important facts; and if they were the only acquisitions of this century, philosophy would still be under an obligation to the natural sciences."

Well, scientific research has no more proved this than Lyell has proved the eternity of the present condition of the earth! The whole field is only accessible to hypothesis, which is more or less supported by facts. History shows us how great theories come and go, while the individual facts of experience and observation form an abiding and constantly growing treasure of knowledge. Philosophy is positively ungrateful enough to claim the whole of this so-called achievement of the positive sciences as her own property. When Kant shows us that our understand-

ing necessarily seeks for every cause an earlier cause, for every apparent beginning an earlier beginning, while the efforts of the reason after unity demand a conclusion, the anthropomorphic origin of the conflicting theories is laid completely bare. We may then seek for further proofs, but must never demand of philosophy that she should not recognise her own children in the many-coloured coat of natural science.

The companion-piece to the 'demonstrated' beginning of organic life is afforded by the contemptuous side-glance with which Liebig complains that the 'dilettanti,' who propose to derive all terrestrial life from the simplest organism of the cell, deal so complacently with an infinite series of years.

It would be interesting to learn any reasonable ground why, in proposing a hypothesis as to the origin of now actually existing bodies, we should *not* complacently dispose of an infinite series of years. The hypothesis of gradual evolution may be attacked on other grounds; that question must stand on its own merits. But if it is condemned because it requires an extraordinarily long series of years, that is to fall into one of the most conspicuous errors of ordinary thought. A few thousand years are familiar enough to us; we can even rise, at the suggestion of the geologists, to millions. Nay, since astronomers have taught us to conceive of distances in space to be reckoned by billions of miles, we may assume billions of years also for the formation of the earth, although this seems to us somewhat extravagant, because we are not, as in the case of astronomy, driven to such assumptions by actual calculation. Beyond these figures, then, the largest to which we are accustomed to rise, there comes *infinity—eternity.* Here we are again in our element; especially the notion of absolute eternity is from our earliest school-days very familiar to us, although we have long been quite clear that we cannot, properly speaking, conceive it. What lies between a billion or a quadrillion and eternity seems to us a fabulous realm into which only the most

luxuriant imagination extravagates. And yet the strictest common sense must tell us that, *a priori*, and before experience has passed judgment, the largest number that we can assume for the age of organisms is not in the least more probable than any power of this number. It would not even be a true methodological maxim to suppose the smallest possible number until a larger one is rendered more probable by the facts of experience. Rather the contrary, indeed; since, in the case of very great and very gradual changes, the real problem lies in forming an idea in how *many years natural forces would be adequate to complete them.* The smaller the number we assume, the *more numerous must be our proofs*, since the shorter space is *a priori* the less probable. In a word, the proof must be adduced *for the minimum*, and not, as prejudice assumes, *for the maximum.* The shrinking, therefore, from great numbers is by no means to be confounded with the shrinking from bold or numerous hypotheses. The hypothesis of gradual development may perhaps on other grounds appear bold or unjustifiable; the largeness of the numbers makes it not in the least more hazardous.

Not less uncritical does Liebig become when he categorically asserts, "Chemistry will never succeed in constructing in the laboratory a cell, a muscular fibre, a nerve, or, in short, any one single portion of the organic frame possessed of vital properties." Why not? Because the Materialists have confounded organic matter with organic parts? That is no ground for such an assertion. We may correct the confusion, and the question of the chemical production of the cell still remains an open and not quite an idle question. It was long believed that the substances of organic chemistry could only originate in the organism. This belief is gone. Shall we now believe that the organism itself can originate only from organisms? One article of faith is dead; long live its successor! Shall we not rather conclude that such dogmas have not much scientific value at all?

Strictly considered, scientific research does not produce Materialism; but neither does it refute it, at least not in the sense in which most of its opponents would like to see it refuted. For the 'limits of natural knowledge' in their true sense by no means satisfy the great mass of its opponents. It requires a considerable degree of philosophical training to find here the solution of the question, and to content oneself with this solution.

Nevertheless, in actual life and in the daily interchange of opinions, scientific inquiry by no means occupies so neutral or even negative an attitude towards Materialism as is the case when all consequences are rigidly followed out. It is assuredly no mere chance that it is almost entirely scientific men who have brought about the revival of Materialistic theories in Germany. Nor is it chance that, after all the 'confutations' of Materialism, now more than ever there appear books of popular science and periodical essays which base themselves upon Materialistic views as calmly as if the matter had been settled long ago. The whole phenomenon sufficiently explains itself from what we have already said. For if Materialism can be set aside only by criticism based upon the theory of knowledge, while in the sphere of positive questions it is everywhere in the right, then as long as those great barriers are overlooked, it is easy to foresee that, for the great masses of those occupied with natural science, the Materialistic order of thought lies exclusively within their field of view. There are only two conditions under which this consequence can be avoided. The one lies behind us; it is the *authority of philosophy*, and the deep influence of religion upon men's minds. The other still lies some distance ahead; it is the general spread of *philosophical culture*[8] among all who devote themselves to scientific studies.

[8] We add a few paragraphs from the first edition, which deal particularly with the demand of philosophical training for the man of science, in connection with the address above mentioned of Von Mohl the botanist. [See Note B. at end of chapter.]

Hand in hand with philosophical goes *historical* culture. Next to the contempt of philosophy, a Materialistic trait appears in the lack of historical genius, which is so often combined with our scientific inquiry. Nowadays a historical view is often supposed to mean a conservative one. This results partly from the fact that learning has often allowed itself, for gold and honour, to be misapplied in supporting obsolete powers, and in serving predatory interests, by pointing to departed splendours and the historical acquisition of rights hurtful to the common weal. Natural science cannot easily be misused for such purposes. Perhaps, too, the continual call for renunciation imposed by science has a bracing effect on character. In this aspect the unhistorical sense of men of science could only redound to their glory.

The other aspect of the matter is, that the lack of historical apprehension interrupts the thread of progress as a whole; that trifling points of view control the course of investigations; that the depreciation of the past is accompanied by a Philistine over-estimate of the present condition of science, in which the current hypotheses are regarded as axioms, and blind traditions as the results of investigation.

History and criticism are often the same thing. The numerous medical men who still regard a seven-months' child as more likely to live than a child of eight usually regard it as a fact of experience. When we have discovered the origin of this opinion in astrology,[9] and are sufficiently rational to doubt the fatal influence of Saturn, we doubt also the supposed fact. Any one who is ignorant of history will, amongst our usual remedies, consider salutary all those which have not been expressly proved by modern inquiries not to be so. But any one

[9] According to the rules of astrology, the seventh month is governed by the equivocal moon, the eighth by destruction-bringing Saturn, the ninth by Jupiter, the star of happiness and perfection. Consequently a birth under the influence of Saturn was regarded as much more threatened by dangers than one under the influence of the moon.

who has once seen a prescription of the sixteenth or seventeenth century, and has well considered that, even after these horrible and absurd compositions, people used to 'recover,' will cease to trust vulgar 'experience,' and will, on the contrary, believe only in those strictly defined effects of any medicine or poison which have been established by the most careful and scientific modern investigations. Ignorance of the history of science was partly the reason that men began some decades ago to regard the 'elements' in modern chemistry as in the main definitely ascertained; while at present it is becoming more and more clear that not only are new ones to be discovered, and others perhaps to be split up, but that the whole idea of an element is a merely provisional necessity.

Many chemists still begin the history of their science with Lavoisier. As in children's histories the dark period of the Middle Ages is often concluded with the words, "Then Luther appeared," so with them Lavoisier appears, in order to banish the phlogistic superstition; upon which, after the delusion is expelled, the science quite spontaneously results from people's common sense. Of course, as *we* regard the matter so must it be regarded! No reasonable man can do otherwise. The right path would long ago have been attained if it had not been for phlogiston! How could old Stahl, too, be so deluded?

On the other hand, he who sees in history the inseparable fusion of error and truth, he who observes how the constant approximation to an infinitely distant goal of perfect knowledge is the result of innumerable stages, he who sees how error itself becomes the bearer of manifold and enduring progress, will not so easily conclude from the undeniable progress of the present age to the incontestableness of our hypotheses. He who has seen that progress is never attained by the sudden dispelling of an erroneous theory, like a cloud before the glance of genius, but that it is only supplanted by a higher theory, which is painfully gained by the most skilful methods of

inquiry, will not regard the effort of some inquirer to demonstrate a new and unfamiliar idea with a contemptuous smile, while he will in all fundamental questions put little trust in tradition, much in method, and none at all in the unmethodical understanding.

Through Feuerbach in Germany and Comte in France an opinion has grown up that the scientific understanding is nothing but ordinary common sense asserting its natural rights after the expulsion of hindering fantasies. History shows us no trace of such a sudden advance of common sense upon the mere removal of some disturbing fantasy; it rather shows us everywhere new ideas making their way despite opposing prejudice, coalescing with the very error that they should dispel, or taking some wrong direction with it, so that the entire expulsion of prejudice is as a rule the final completion of the whole process, as it were the cleaning of the completed machine. In fact—to keep for brevity's sake, to our figure—error often appears historically as the mould within which the bell of truth is cast, and which is only broken up when the casting is complete. The relation of chemistry to alchemy, of astronomy to astrology, may illustrate this. That the most important positive results are only attained after the completion of the foundations of a science is natural. We owe to Copernicus, as to details, very little of our present knowledge of the starry sky; Lavoisier, who retained the last relics of the old alchemy in the primitive acid for which he sought, would be a child in our modern chemistry. When the true foundations of a science are secured, a great mass of consequences present themselves with relatively little mental labour: it is easier to strike a bell than it is to cast one. But whenever an important step forward is made in principles, we have nearly always the same spectacle presented; a new idea takes its place despite prejudice—at first, perhaps, even supported by it. Only as it unfolds does it burst asunder the rotten coverings. Where there is not this idea, this positive effort,

the dispelling of prejudice does us no good at all. In the Middle Ages many were free from belief in astrology. In all times we find traces of ecclesiastical and secular opposition to this superstition; but it was not from amongst these men, but from the astrologers that astronomy proceeded.

The most important result of historical study is the academic calmness with which our hypotheses or theories are regarded without enmity and without credulity as what they are—as stages in that endless approximation to truth which seems to be the destiny of our intellectual development. This, of course, at once disposes of any system of Materialism, so far as it presupposes at least a belief in the transcendental existence of matter. But as regards progress in the exact sciences, assuredly he will not be most capable of discoveries who despises the theory of yesterday and swears by that of to-day; but he who sees in all theories but a means of approximating to the truth, and of surveying and mastering the facts for our purposes.

This freedom from the dogmatism of theories does not exclude the employing of them. We should deviate just as far on the other side from the true course if we were to suppress in their birth all general ideas on the connection of things, and cling obstinately to mere detail, to the sensibly demonstrable facts. As the mind of man only finds its highest satisfaction—one that transcends the sphere of natural knowledge—in the ideas which it produces from the imaginative depths of the spirit, so it cannot devote itself successfully to the serious and severe labour of research, without resting, as it were, in the idea of the universal, and drawing fresh energy from it. Classifications and laws serve us on the one hand, as Helmholtz has very rightly shown, as a means of remembering and surveying an otherwise unsurveyable sum of objects and events; but, on the other hand, this embracing as a whole of the manifold in phenomena answers to the synthetic impulse of our mind, which everywhere strives after unity, as well in the great whole of philosophy as in the

simplest concepts embracing a plurality of objects. We shall now no longer, as did Plato, ascribe to the universal, as opposed to the individual, a truer reality and an existence independent of our thought; but within our subjectivity it will be to us more than the mere bracket that holds the facts together.

And this subjectivity of ours, too, has its significance for the man of science also, since he is not a discovering-machine, but a man in whom all sides of human nature work in inseparable unison. But here we find Materialism again on the opposite side. The same mental tendency which, on the one hand, leads to our transforming great hypotheses as to the basis of phenomena into a fixed dogma, shows itself, on the other hand, very shy of the collaboration of ideas in scientific research. We have seen how in antiquity Materialism remained sterile because it adhered doggedly to its great dogma of atoms and their motion, and had little sense for new and bold ideas. The Idealistic school, on the contrary, especially the Platonists and Pythagoreans, gave antiquity the richest fruits of scientific knowledge.

In modern times an incomparably more favourable account of Materialism can be given as regards its participation in inventions and discoveries. Atomism, which once only led to speculations as to the possibility of phenomena, has become since Gassendi the basis of physical investigation into the actual! The mechanical theory of the world has since Newton gradually dominated our whole apprehension of nature. Thus, if we only leave out of view the 'limits of natural knowledge,' Materialism is now not only the result, but, strictly speaking, the very presupposition of all scientific study. But, of course, the more clearly and generally this is perceived, so too the critical standpoint of the theory of knowledge, which again destroys Materialism, spreads more and more amongst scientific men, and always first amongst the most important and most far-seeing of them. It does not in the

least stay the triumphal march of scientific research if the naïve belief in matter disappears, and there opens behind all nature a new and infinite world, which stands in the closest connection with the world of the senses, which is perhaps the same thing merely regarded from another side, but which is just as familiar to our subject, to our Ego with all the emotions of its spirit, as the proper home of its inmost essence, as the world of atoms with their eternal vibrations stands opposed to it as strange and cold.

Materialism, of course, seeks to make the world of atoms, too, the true home of the mind. This cannot be without influence upon its method. It trusts the *senses*. Even its metaphysic is formed on the analogy of the world of experience. Its atoms are small corpuscles. We cannot indeed represent them as small as they are, because that transcends any human conception; but we may represent them by comparison, as though we saw and felt them. The whole Materialistic theory of the world is brought about through the senses and the categories of the understanding. But precisely these organs of our mind are chiefly real in their nature. They give us *things*, even though no thing in itself. The deeper philosophy comes behind, that these things are our conceptions; but it cannot alter the fact that precisely the class of those conceptions which are related to things through understanding and sensibility has the greatest permanency, certainty, and regularity, and for that very reason we may conjecture, also the strictest connection with an external world governed by eternal laws.

Materialism too is imagining, when it represents to itself the elements of the phenomenal world, but it is imagining in the naïvest way under the guidance of the senses. In this constant leaning upon those elements of our knowledge which have the best regulated function, it possesses an inexhaustible spring of pure method, a protection against error and fantasy, and a purer feeling for the language of things.

It has the drawback, moreover, of a comfortable contentment with the world of phenomena, which allows sense-impressions and theories to become fused into an inextricable whole. As the impulse is wanting to go beyond the apparent objectivity of the sensible phenomena, so too the impulse is wanting to charm a new language from things by paradoxical questions, and to undertake experiments which, instead of aiming merely at mere extension in detail, rather destroy previous modes of thought, and bring with them entirely new insight into the sphere of science. Materialism is, in a word, conservative in science. How it happens that it nevertheless becomes, as to the most important departments of life, under certain circumstances a revolutionary ferment will appear farther on.

Idealism is in its very nature metaphysical speculation, although a speculation which may appear to us as the enthusiastic representative of higher unknown truths. The circumstance that an imaginative, creative impulse is contained in our breasts, which in Philosophy, Art, and Religion often comes into direct contradiction with the witness of our senses and understanding, and then again can produce creations which the noblest and soundest of men hold higher than mere knowledge, this circumstance of itself points to the fact that Idealism too is connected with the unknown truth, although in a very different way from Materialism. In the witness of the senses all men agree. Mere judgments of the understanding do not hesitate or err. But ideas are poetic births of the single *person;* perhaps powerful enough to master whole ages and peoples with their charm, but still never universal, and still less immutable.

Nevertheless the Idealist might go just as safely in the positive sciences as the Materialist, if he would only constantly remember that the phenomenal world—however much it is mere appearance—is yet a connected whole, into which no foreign members may be introduced without

risk of ruining the whole. But the man who once soars aloft into the world of ideas is continually in danger of confounding it with the sensible world, and thereby of falsifying experience or of passing off his speculations as "true" or "correct" in that prosaic sense in which these terms belong only to the knowledge of the senses and the understanding. For apart from the so-called 'inner truth' of Art and Religion, the criterion of which consists only in the harmonious satisfaction of the soul, and has absolutely nothing at all in common with scientific knowledge, we can only describe as true what *necessarily* appears so to every being of human organisation, and such an agreement can only be found in the knowledge of the senses and understanding.

There exists, however, a connection between our ideas and this knowledge—a connection in our mind, whose creations only transcend nature in their object and intention, while, as thoughts and products of human organisation, they are equally members of the phenomenal world, which we find everywhere cohering by necessary laws. In a word, *our ideas, our brain-fancies, are products of the same nature which produces our sense-perceptions and the judgments of our understanding.* They do not arise in the mind quite casually, irregularly and unexpectedly, but they are, properly considered, products of a psychological process, in which our sensible perceptions likewise play their part. The idea is distinguished from the fancy by its *value*, not by its *origin*. But what is meant by value? A relation to the nature of man, and to his perfect, ideal nature. Thus idea measures itself by idea, and the roots of this world of intellectual values run back, just as much as the roots of our sense-conceptions, into the inmost nature of man, which is withdrawn from our observation. We can psychologically comprehend the idea as a product of the brain; as intellectual value we can only measure it by similar values. The cathedral at Köln we

compare with other cathedrals and other works of art; its stones with other stones.

Ideas are as indispensable for the progress of the sciences as facts. They do not necessarily lead to metaphysic, although they always overstep experience. Springing from the elements of experience unconsciously and rapidly as the shooting of a crystal, the idea may refer back to experience, and seek its confirmation or rejection in experience. The understanding cannot make the idea, but it regulates it and favours it. The scientific idea arises, like the poetical, like the metaphysical idea, from the interaction of all the elements of the individual mind; but it takes a different course, since it submits itself to the judgment of investigation, in which only the senses, the understanding, and the scientific conscience sit as judges. This tribunal demands not absolute truth, otherwise the progress of humanity would be in very doubtful case. Utility, compatibility with the witness of the senses in the experiment challenged by the idea, decided preponderance over the opposite views—this is enough to give the idea the right of citizenship in the realm of science. Childish science constantly confuses idea and fact; science, which has developed and become sure and methodical, shapes the idea, with the help of exact research, into hypothesis and finally into theory.

Even the most one-sided Idealist will never entirely despise the attempt to call experience itself to bear witness to its own insufficiency. If in the facts of the sensible world no trace could be found to show that the senses give us only a coloured and perhaps quite inadequate picture of the real things, it would be anything but well with the conviction of the Idealist. But even the commonest illusions of the senses afford a hold for his view. The discovery of the universal proportion in musical tones followed from an idea of the Pythagoreans, which contradicts original sense appearances; for in sound our ear does not give us the least consciousness of a universal

proportion. Yet the senses themselves testified for the senses; the divided string, the various dimensions of metallic hammers, were sensibly observed in connection with the various tones. So the idea of the vibration theory of light, once rejected, was later again received on the evidence of the senses and of the calculating understanding; the phenomena of interference could be observed.

From this it follows that the Idealist also may be a scientific inquirer; but his inquiries will, as a rule, exhibit a revolutionary character, just as the Idealist with regard to the state, to civic life, to conventional morality, is the bearer of revolutionary ideas.

We must not forget, however, that we have to do with degrees of more or less. Apart from the few champions of consequent systems, there are in actual life no more Idealists and Materialists—as definite classes of individuals—than there are phlegmatic and choleric persons. It would be childish to suppose that no man who is in the main a Materialist could have a scientific idea which entirely overturns traditional views. Our scientific men have almost all, especially now, when the tendency of the age is in that direction, Idealism enough, although they chiefly believe what they can see and feel.

In the history of modern scientific inquiry we cannot distinguish so surely as in antiquity the influences of Materialism and Idealism. So long as we do not possess very careful biographies of the chief leaders of scientific progress, which take account of *the whole man*, the ground beneath our feet is very uncertain. The pressure of the Church prevented for the most part the expression of real opinions, and many a noble man speaks to us yet only through the facts of his discoveries, in whom we may well presume fertile speculation, mighty struggles of mind, and a treasure of profound ideas.

Most scientific men of our own day think very little of ideas, hypotheses, and theories. Liebig, on the other hand, in his complaints against Materialism, goes too far, again,

when, in his Discourse on Bacon, he entirely rejects empiricism.

"In all investigation Bacon sets great value on experiments. Of their meaning, however, he knows nothing. He looks upon them as a sort of mechanism, which once put in motion brings forth the result of itself. But in science all investigation is deductive or *a priori*. Experiment is but an aid to the process of thought, like a calculation: the thought must always and necessarily precede it if it is to have any meaning.

"An empirical mode of research in the usual sense of the term does not exist. An experiment not preceded by a theory, that is, by an idea, bears the same relation to scientific research as a child's rattle does to music."

Strong words! But in truth empiricism is not in quite such desperate case. Liebig's masterly analysis of Bacon's experiments, for which philosophers and historians must feel grateful to him, has shown us indeed that from Bacon's experiments not only nothing resulted, but also that nothing *could* result. But we find enough to account for this in the unconscientiousness and frivolity of his procedure, in the capricious taking up and abandoning of his object, in the want of concentration and perseverance; especially, in fine, in his superfluity of methodical crotchets and artifices, which overgrow the useful part of the method, and offer refuges to caprice and feebleness, while they are of no practical application whatever. If Bacon had only developed the idea of induction and the by no means unimportant doctrine of negative and prerogative instances, his own method would have compelled him to greater stability. But as it was, he devised the hesitating classifications of the *instantiæ migrantes, solitariæ, clandestinæ*, &c., which throw open the door to every kind of caprice, assuredly in the vague impulse to be able to prove his favourite ideas. That no idea guided him in his inquiries seems to us to be by no means the case; rather the contrary. His doctrine of heat, for

instance, which Liebig exposes so unsparingly, looks altogether towards a preconceived opinion.

In the overloading of his theory of proof with useless notions, Bacon betrays the effects of the Scholasticism he is combating; but it was not then empty ideas which hindered the success of his researches, but the entire lack of those qualities which qualify for research in general. Bacon would have been just as little able to edit critically an ancient author as he was to make a proper experiment.[10]

It is a peculiarity of fruitful ideas that they are only developed, as a rule, in the course of thorough and persevering occupation with a definite object; but such an occupation may be fruitful even without guiding theories. Copernicus devoted his whole life to the heavenly bodies; Sanctorius to his scales: the former had a guiding theory, which sprang up in early years from philosophy and observation; but was not Sanctorius too a man of science?[11]

APPENDIX.

Note A (*See Note* 1).

The old Faculties formed themselves pretty quickly after the rise of the University of Paris, the arrangements of which became the model for Germany. They stand in the closest relation each to a particular practical avocation; for the Philosophical Faculty only became a distinct whole through the separation of the other three. It remained the general faculty as compared with the three special ones, devoted partly to the common preparation for professional studies, partly to free science. All newly arising sciences naturally fell to it, so far as they did not stand in intimate relation to some special pursuit. If the original principle on which the

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[10] On Bacon's scientific and personal character comp. i. p. 236 and Note 60.

[11] There followed here in the first edition a methodological exposition which went into too much detail for the purpose of the work, from which, however, we retain some passages, the interest of which is not yet over. [See Note C.]

universities were formed had remained a living principle, possibly several new faculties might have been formed of the same character as the existing ones, as, *e.g.*, a cameralistic, a pædagogic, or an agricultural faculty. Nor is there any intrinsic objection to the formation of a new faculty in a new principle; we must only establish that this is so, and then closely examine the new principle. We have before us a regular war of the faculties, in which the philosophers have the worst of it. The medical men first propose the establishing of the scientific faculty; the men of science wish to tear themselves away from the maternal embrace of the *facultas artium*. Their colleagues will not let them go, and there is a regular struggle for emancipation. We can see that the philologist of the schools allows himself to be carried too far by regard for a certain unity in the training of future teachers; but a real philosopher should never meet an actually felt need for such a separation by dogged adherence to the existing state of things. He should rather ask himself what is the foundation of the repulsive force which demands the separation; he should endeavour by his services to make himself indispensable to those whom he wishes to retain. If a university has no men who in such a case stand above the controversy, and above all inquiry into the inner aspect of the matter, then it has no philosopher at all. When Feuerbach declares that it is the specific work of a philosopher to be no professor of philosophy, this is a gross exaggeration; but so much is certain, that at present a bold and independent man will not easily obtain a public chair in Germany. We complain of the neglect of the natural sciences; we might rather complain of the strangling of philosophy. We must not take it ill of the Tübingen men of science if they endeavour to free themselves from a dead body; but we must deny that this separation is determined by the nature of scientific research and of philosophy.

The natural sciences possess, in their clear and luminous method, in the convincing force of their experiments and demonstrations, a powerful safeguard against the corruption of their doctrines by men who work at direct variance to the principles of their investigation; and yet, if philosophy is entirely suppressed and laid aside, the time might come when in scientific faculty a Reichenbach should teach Odyle force, or a Richter controvert Newton's law. In philosophy wantonness of thought is easier to commit and easier to cloak. There is no so sensuously clear and logically certain criterion of the sound and true as in natural science. Meanwhile we will propose a remedy. If the men of science voluntarily come back to philosophy without, therefore, altering a little the strictness of their method—if we begin to recognise that all distinctions in the faculties are superfluous—if philosophy, instead of being an extreme, rather forms a link between the most various sciences, and effects a fruitful interchange of positive results—then we will admit that she is capable once more of the great function of holding up to the age the torch of criticism, of gathering the rays of knowledge into a focus, and of advancing and moderating the revolutions of history.

The neglect of natural science in Germany is due to the same conservative tendency as the depression and corruption of philosophy. Especially there

has been a want of money; and it will unhappily be a long time before we have come up with England and France in this respect. (This has, at least as regards France, already ceased to be the case.) Herr von Mohl saw, in the physical museum of a German university, "a fearful instrument which was supposed to represent an air-pump. The academic commission, upon whose approval and direction depended the equipment of the physical professor, had determined, in order that the work might not go to a foreign instrument-maker, that the air-pump should be jobbed out to a fire-engine maker." This affords an opportunity for bemoaning the subjection of the physical professor to the control of the other members of his faculty. But is a decent provision for such requirements at the free disposal of the physical professor not conceivable without a separation of the faculties? And is not even in the present state of things the philosopher, who must be acquainted with scientific methods and the prerequisites of their application, the natural colleague of the physicist?

But no! There is the hitch. Descartes, Spinoza, Leibniz, Kant would be so; but the majority of our present philosophical professors—there Herr von Mohl is quite right; only he should not lay the blame upon Philosophy herself, nay, even attribute it to the very nature of philosophical thought, if nowadays such a co-operation is not easily to be expected.

NOTE B (*See Note* 8).

We demand from the modern scientific inquirer more philosophical culture, but not more inclination to construct original systems themselves. On the contrary, in this respect we are not yet freed from the evils of the period of the philosophy of nature. Materialism is the last offshoot of that epoch, when every botanist or physiologist thought that he must bless the world with a system.

But who, then, ever asked such men as Oken, Nees von Esenbeck, Steffens, and other students of nature to philosophise instead of to inquire? Has any philosopher, even in the most delirious age, seriously proposed to replace exact research by his system? Even Hegel, the most arrogant of modern philosophers, never regarded his system in this sense as the definitive conclusion of scientific knowledge, as it must have been on the view we are controverting. He recognised thoroughly that no philosophy can get beyond the sum of the intellectual influences of its time. It is true that he was so far blinded as to overlook the rich philosophic treasures which the individual sciences bring ready-made to the thinker, and especially to estimate far too lowly the intellectual value of the exact sciences. On the other hand, the men of science in these days prostrated themselves before speculation as before an idol. If their own science had been more strongly based in Germany, it could have better resisted the tempests of the mania for speculation.

(Further on, with reference to Mohl's contention that often a mutual understanding between scientific research and philosophy becomes quite impossible):

Thus the man of science learns from things; the philosopher will know everything from himself, and therefore they do not understand each other.

The misunderstanding can only arise where they both speak of the same things, and thus give different results on different methods. They understand now, or they do not understand, that they are proceeding on different methods. When, for instance, a professor of philosophy will prove to medical men, "in a scientific way," all kinds of metaphysical hocus-pocus, then this professor, and he only, is to blame for this misunderstanding. Even real philosophers will reject such an anthropologist just as sharply as the man of science, perhaps more sharply, because as a student of the two modes of procedure he more quickly sees through the errors of method. An example of such a scientific police was furnished some years ago by Lotze in his Polemic (1857) against the anthropology of the younger Fichte. He only made one mistake, that after he had scientifically quite defeated him he proposed to shake hands and exchange gifts, like the Homeric heroes. The Homeric heroes gave no more presents to the man they had beaten!

The same result may follow when a man of science commits the same error, that is, when he tries to pass off his metaphysical dreamings in the guise of facts. Only in this case the stricken man of science will often exercise the promptest supervision, because he knows most precisely the way in which the supposed facts have been developed.

But when we require higher philosophical culture from the scientific inquirer, it is by no means speculation that we would so pressingly commend to him, but philosophical criticism, which is indispensable to him, just because he himself in his own thinking, despite all the exactness of special researches, will never succeed in wholly suppressing metaphysical speculation. Even in order more correctly to recognise his own transcendental ideas as such, and to distinguish them more surely from what is given by experience, he needs the criticism of ideas.

If, now, a certain judicial function is assigned to philosophy in this respect, this by no means involves any pretension to guardianship. For apart from the fact that every one can be a philosopher in this sense who knows how to handle the universal laws of thought, the sentence never refers to the strictly empirical element, but to the metaphysic mixed up with it, or to the purely logical side of inference and the formation of ideas. What meaning is there, therefore, in the comparison of the relation of the natural sciences to philosophy, to the attitude of philosophy to the dogma of the theologian? If it means to suggest the need of an emancipation, then we have a great anachronism before us. Philosophy no longer needs to demand her freedom from theological dogmas. It is perfectly obvious that she is in no way called upon to govern herself according to these dogmas. But she will, on the other hand, always claim the right to deal with these dogmas, and that as objects of her investigation. The dogma is to the philosopher no scientific principle, but the expression of the faith and the speculative activity of an historic period. He must endeavour to understand the rise and decay of dogmas in connection with the moral and intellectual development of humanity, if he is to perform his task in this department.

Exact research must be every philosopher's daily bread. Though the pride

of the empiricist may prefer to retire into a sphere of his own, yet he can never hinder the philosopher from following him. There is no longer any philosophy conceivable at our present standpoint without exact research, and exact research is itself just as much in need of continual clarifying by philosophical criticism. It is not dilettanteism where the philosopher makes himself acquainted with the most important results and the methods of all the natural sciences, for this study is the necessary basis of all his operations. So, again, it is not dilettanteism if the man of science forms for himself a definite, historically, and critically justifiable view as to the thinking processes of mankind, to which he is inextricably bound despite all the apparent objectivity of his investigations and conclusions. But we must call it censurable dilettanteism—without, however, denying that favoured minds may really embrace both provinces—when the philosopher, in Bacon's fashion, dabbles in experiments with untrained sense and unpractised hand, and when the man of science, without troubling himself with what has been thought and said before him, by the arbitrary treatment of traditional ideas, patches himself together a metaphysical system of his own.

It is none the less true, however, that philosopher and man of science can exert a stimulating influence upon each other, by meeting on the ground which is, and must remain, common to both—the criticism of the materials of exact research in reference to the possible conclusions. Presupposing that a strict and sober logic is employed on each side, hereditary prejudices are thus subjected to an active cross-fire, and service is done to both sides.

What, then, is the meaning of the theory of mutual *laissez-faire* on account of the utter impossibility of an understanding? It seems to us as though in this very principle we have expressed the extreme one-sidedness of Materialism. The consequences of a general application of this principle would be that everything would fall into egoistic circles. Philosophy falls a complete prey to the trades-union spirit of the faculties. Religion—and this, too, belongs to ethical Materialism—supports itself in the shape of crass orthodoxy upon the perversions and the political rights of the Church; industry engages in a soulless chase after the momentary profits of exploitation; science becomes the shibboleth of an exclusive society; the State inclines to Cæsarism.

Note C (*See Note* 11).

Perhaps we are justified in designating as Materialistic a peculiar feature of modern scientific inquiry, consisting in opposition to the strictness of exact inquiry; of course not an opposition supporting itself on the libertinism of the idea, but an opposition resulting from excessive regard for immediate sensuous conviction.

Not to run out into vague generalities, we will connect our observations with the remarkable instance of this opposition that has occurred in Germany in the last few years. We mean the reaction of some physiologists against an essay of the mathematician Radicke on the Meaning and Value of the Arithmetical Mean. Radicke published in 1858, in the 'Archiv

für phys. Heilkunde,' an extended treatise, the object of which was to subject the excessive accumulation of discoveries in physiological chemistry to a critical sifting. For this purpose he employed an ingenious and independent as well as correct procedure, in order to estimate logically the relation of the arithmetical mean from the series of experiments to the deviations of the individual experiments from this mean. It resulted from the application of the principles developed to many hitherto highly valued investigations, that the series of experiments in these investigations gave no scientific result at all, because the individual observations showed too great variations to allow the arithmetical mean to appear with sufficient probability as the product of the influence under investigation. Against this extremely valuable and mathematically inexpugnable essay opposition was raised by several medical men of note, and this opposition produced the singular judgments which we think it our duty to mention here. Vierordt remarked of the essay, which in general he approved, "that besides the purely formal logic of the calculus of probabilities with its mathematical rigour, there is in many cases a *logic of the facts* themselves, which, rightly applied, possesses for the specialist a less, though it may be a very high, degree of proof." The insidious but yet at bottom very unhappily chosen expression, "logic of facts," found approval with many persons to whom the cutting rigour of mathematical methods might be inconvenient. It was, however, proved by Professor Ueberweg, a logician eminently fitted for the treatment of such questions (Archiv für pathol. Anat. xvi.), to possess a very moderate measure of justification. Ueberweg showed convincingly that what may be designated as "logic of facts" may in many cases have a certain value as the preliminary of a stricter investigation, "much as an estimate by the eye so long as a mathematical measurement is impossible;" but that when the calculation has been correctly carried out, there can be no question of a different result obtained through the logic of facts. In fact, that immediate consciousness which comes to the specialist during his experiments is just as much liable to error as any other prejudice. We neither have any reason to doubt that such convictions form themselves during experimentation, nor to suppose that more value may be ascribed to them than generally to the formation of convictions in non-scientific fashion. The really probative element in the exact sciences is not the material fact, the experiment in its immediate influence on the senses, but the ideal colligation of the results. There undoubtedly exists, however, amongst many inquirers, and especially amongst physiologists, an inclination to regard the experiment itself, and not its logical and mathematical interpretation, as the essential part of the investigation. From this there easily follows a relapse into the utmost caprice in theories and hypotheses; for the Materialistic idea of an undisturbed communion between the objects and our senses is inconsistent with human nature, which everywhere, even into the apparently most immediate activity of the senses, manages to introduce the effects of prejudice. That these effects are eliminated is indeed the great secret of all method in the exact sciences, and it is a matter of complete indifference whether we have to do with cases in which we work with *average values*, or with

cases where even the *single* experiment is of importance. The average value serves primarily only to eliminate objective deviations; but in order to avoid subjective errors also, the first condition is to determine the probable error in the mean value itself, which also exactly denotes the limits of unjustifiable interpretations. Only if the probable error is sufficiently small to let us regard one result as trustworthy does the series of observations as a whole stand upon the same logical ground as a single experiment in fields where the elimination of objective deviations by a sure mean value is not required. If, *e.g.*, the object of an experiment is to test the behaviour of a newly-discovered metal towards the magnet, if we take all the usual precautions and have good apparatus, the *single experiment* will be enough, since the phenomenon in question can easily be *repeated*, without the small irregularities in the strength of the effect, which will always be present, at all affecting the principle which is to be proved.

These considerations will also determine our judgment of the somewhat more cautious polemic of Voit against Radicke in his 'Untersuchungen über den Einfluss des Kochsalzes, des Kaffees und der Muskelbewegungen' (München, 1860). He often finds in his own investigations differences between individual observations, which must be regarded *not* as casual variations, but rather as differences determined by the nature of the organism and uniformly appearing; as, *e.g.*, the dog under experiment with precisely the same flesh diet now excretes a greater and now a less quantity of urine, and conversely in the case of fasting. But where there is reason to suppose such differences in the very nature of things, it is so obvious that we do not operate with mean values, that it is hard to understand how such a case could be employed at all against Radicke. But whether now, as Voigt requires, in that case we must ascribe to every single trial the value of an experiment entirely depends, as in every experiment, upon the possibility of its repetition under like circumstances; and only when it is repeated can it be seen whether what is to be established is made sufficiently clear in any single trial, or whether we must institute a differently combined series of trials from which to deduce the mean values.

If, that is, in the first series of trials, we have the values a, b, c, d, . . . which show not mere variations, but a distinct progress; then in order to confirm this first trial we require a second, which may give us the values a_1, b_1, c_1, d_1, . . . If the progress is again quite clear, and our only object is to establish this progress generally, there the matter rests. But if we want numerically exact results, and the correspondence is not complete, there is nothing left but to proceed with a third series, a_2, b_2, c_2, d_2, . . . and so on to a_n, b_n, c_n, d_n, . . . when it becomes obvious that we must now combine the values a_1, a_2, a_3 . . . a_n, and, again, b_1, b_2, b_3 . . . b_n. But to these combinations the full force of the method proposed by Radicke must now apply.

CHAPTER II.

FORCE AND MATTER.

"THE world consists of atoms and empty space." In this principle the Materialistic systems of antiquity and of modern days are in harmony, whatever differences may have gradually developed themselves in the notion of the atom, and however different are the theories as to the origin of the rich and varied universe from such simple elements.

One of the most naïf expressions of our modern Materialism has escaped from Büchner; when he calls the atoms of modern times "discoveries of natural science," while those of the ancients are said to have been "arbitrary speculative conceptions."[12] In point of fact, the atomic doctrine to-day is still what it was in the time of Demokritos. It has still not lost its metaphysical character; and already in antiquity it served also as a scientific hypothesis for the explanation of the observed facts of nature. As the connection of our atomism with that of the ancients is historically established, so too all the enormous progress in the present view of the atoms has been gradually developed from the interaction of philosophy and experience. It is indeed the main principle of modern science, the *critical* principle, which has, by its combination with Atomism, brought about this fruitful development.

Robert Boyle, "the first chemist whose exertions were

[12] Büchner, Natur u. Geist, S. 102: "Die Atome der Alten waren philosophische Kategorien oder Erfindungen; die der Neuen sind Entdeckungen der Naturforschung."

directed only by the noble impulse to investigate nature," travelled over the Continent as a means of culture in his earlier years, precisely at the time when the scientific controversy between Gassendi and Descartes burst out. When he settled at Oxford in 1654, in order to devote his life henceforth to science, Atomism as a metaphysical theory had already succeeded in establishing itself. But the very science to which Boyle had devoted himself was the last to free itself from the fetters of medieval mysticism and Aristotelian conceptions. It was Boyle who introduced the atoms into that science which has since made the most extensive use of this theory; but it is also Boyle who, by the very title of his 'Chemista Scepticus,' 1661, announces that he has trodden the path of exact science, in which the atoms can no more form an article of faith than the philosopher's stone.

Boyle's atoms are still very much those of Epikuros, as they had again been introduced into science by Gassendi. They still have various shapes, and this shape has an influence upon the stability or laxity of the combinations. By violent motion at one time cohering atoms are torn asunder, at another others are brought together, and, just as in the ancient Atomism, they fasten on one another with their rough surfaces by projections and teeth.[13]

[13] Kopp, Gesch. der Chemie, ii. 307 ff., unjustly ascribes to Boyle a theory of "attraction" of the atoms. "This chemist," says he, "already favoured the view that all bodies consist of smallest particles, upon whose *attraction to each other* the phenomena of combination and decomposition depend. The more *affinity* two bodies have for each other, the more strongly do their smallest particles attract each other, the more nearly do they lie together in combination." Of this account only the last words are at bottom true. Even in the example quoted by Kopp there is nothing about affinity and attraction. The terms "coalition," "associate," &c., are always to be referred to the connection in the case of contact. Boyle's real view appears very clearly from the section 'De Generatione, Corruptione et Alteratione,' pp. 21–30, in the treatise 'De Origine Qualitatum et Formarum:' Genevæ, 1688. He speaks everywhere of an adhering or tearing asunder of the atoms, and the cause of change is (§ 4) "motus quacunque causa ortus," that is, that continual rapid motion of the atoms which had been assumed by the ancients also, the origin of which they derive from the universal and everlasting downward motion. This derivation, of course, Boyle could not employ, but

When a change takes place in the chemical combination, the smallest particles of a third body force themselves into the pores which exist in the combination of the two others. They can thus combine with one of them, because of the constitution of their surfaces, better than it was combined with the other, and the violent movement of the atoms will then carry away the particles of the latter. In this respect, however, Boyle's Atomism differed from the ancient, in that he assumes with Descartes a shivering of the atoms by the motion, and that he either leaves the origin of their motion in obscurity, or ascribes it to the immediate interference of God.

This form of Atomism must, above all in England, necessarily fall to pieces as soon as Newton's law of gravitation was accepted. We have seen in the First Book how rapidly the purely mathematical assumption of Newton became transformed into a new theory, entirely opposed to all previous ideas. With the *attraction* of the smallest particles of matter, the rough surfaces and manifold forms of the atoms became superfluous. There was now another bond which held them together without any contact, viz., attraction. The impact of the particles on each other lost its importance; even for the imponderables, from whose activity Newton still tried to derive gravitation, an analogous principle was found—that of *repulsive forces.*

The whole history of the modifications in the notion of the atoms is extremely clear so soon as we confine ourself to England and the ideas there developed by physicists and philosophers. Let it only be recollected that Hobbes, whose influence was so important, made the idea of atoms a *relative* one. There were, according to him, as it were, atoms of *different order*, just as mathematicians distinguish

he is very far from substituting for it attraction and repulsion—notions which only developed themselves some decades later in consequence of Newton's theory of gravitation. Rather does Boyle attribute, when he engages in speculation, the origin of atomic motion to the activity of God; but in ordinary scientific contemplation he simply leaves it dark, and contents himself with assuming the existence of such a motion.

different orders of the infinitely little. An application of this theory was the assumption of imponderable atoms, which are found in the interspaces of gravitating matter, and which, in relation to the corporeal atoms, are conceived as infinitely little. So long, then, as the mechanism of impact was retained, it was these atoms of the second order which, by their motion, produced on the one hand the phenomena of light, but on the other hand produced also the gravitation of the atoms of the first order. As soon, however, as the idea of *actio in distans* had gained a place, it was consistently applied also to the imponderable atoms, and they now exerted their repulsive influence without any actual impact. But with this the idea of the constitution of matter, as Dalton found it, was fundamentally complete; for the fact that in Dalton's time there was assumed, not atoms of the second order, but a continuous covering of light and heat about the ponderable atoms, is not a very essential innovation. Even Descartes and Hobbes assumed, in fact, a permanent filling of space, since they conceived all the interstices between greater particles as occupied by smaller and ever smaller particles. At all events, Dalton found this view too in existence when he was, towards the end of the eighteenth century, conducted to the ideas which have given his name a lasting place in the history of science.

Starting from an observation on the different states of bodies, he says, "These observations have *tacitly* led to the conclusion, *which seems universally adopted*, that all bodies of sensible magnitude, whether liquid or solid, are constituted of a vast number of extremely small particles, or atoms of matter, bound together by a force of attraction, which is more or less powerful according to circumstances, and which, as it endeavours to prevent their separation, is very properly called in that view 'attraction of adhesion;' but as it collects them from a dispersed state (as from steam into water), it is called 'attraction of aggregation,' or more simply 'affinity.' Whatever names it may go by,

they still signify one and the same power. . . . Besides the force of attraction, which, in one character or another, belongs universally to ponderable bodies, we find another force that is likewise universal, or acts upon all matter which comes under our cognisance, namely, a force of repulsion. This is now generally, and I think properly, ascribed to the agency of heat. An atmosphere of this subtile fluid constantly surrounds the atoms of all bodies, and prevents them from being drawn into actual contact."[14]

If we reflect that the physical conception of attraction only became recognised through the disciples of Newton in the first decades of the eighteenth century, it will seem that a period of about fifty years was enough so entirely to remodel the ancient notion of atoms, that Dalton could find the result as a universally accepted fact. Even the likeness of the smallest particles of every like substance, a point which it is one of Dalton's peculiar services to have strongly maintained, is at bottom only a consequence of the same great revolution in physical principles; for if the atoms no longer had immediate contact with each other, there was no longer any reason for assuming different shapes laying hold of each other by their teeth and projections.

'Affinity,' which is with Dalton nothing more than the general force of attraction in its particular chemical manifestation, was originally a genuine scholastic quality which formed part of the favourite apparatus of the alchemists.[15]

[14] Dalton, New System of Chemical Philosophy, vol. i., 2d ed., Lond., 1842, p. 141 ff., 143 ff. Comp. Kopp, Gesch. d. Wissensch. in Deutschland: Entwickel. der Chemie, München, 1873, S. 286, where, however, it is not sufficiently observed that as to the middle portion of the longer passage, viz., the assertion of the likeness of the particles in homogeneous bodies, the remark that this is universally adopted does not hold good. Weihrich, Ansichten der neueren Chemie, S. 7, says that the view as to the likeness of the atoms in the same body, and their variety in different bodies, seems to come from Baron von Holbach, though it is originally due to Anaxagoras; but, in fact, there is not sufficient agreement between Holbach and Anaxagoras, or Dalton and Holbach, to allow us to recognise the thread of tradition here.

[15] Kopp, Gesch. d. Chemie, ii. 286 ff., disposes of the opinion that the

It must therefore have been simply laid aside by the spread of the mechanical cosmology, like other such notions, if the transcendental turn taken by the theory of gravitation had not come to its aid.[16] Newton assumed attractive forces even for the smallest particles of ponderable matter; of course, with the reservation of a future explanation of this attraction from the motion of imponderable matter. He only declares himself against the identity of chemical action and gravitation, because he conjectures a different relation for the dependence of force upon distance in the two cases. In the beginning of the eighteenth century clear water had already been reached. Buffon regarded chemical attraction and gravitation as identical. Boerhave, one of the clearest heads of the century, returned to the φιλία of Empedokles, and maintained expressly that the chemical changes were produced, not by *mechanical impact*, but by a *combining impulse*, as he explains the expression 'amicitia.' Under these circumstances, even the 'affinitas' of the scholastics might again venture out. Only, of course, the etymological meaning of the expression had to be given up. The 'relationship' remained a mere name; for instead of an inclination resting upon likeness, there appeared rather an effort towards union which seemed to rest upon *opposites*.

"At the beginning of the eighteenth century," says Kopp, "there arose much opposition to this term, especially among the physicists of that time, who feared that

term 'affinitas' was first introduced into chemistry in 1696 by Barchusen. He shows partly that it occurs in various authors from 1648 (Glauber), but also that it occurs in Albertus Magnus (in the 'De Rebus Metallicis,' printed 1518). We may mention further that the term 'affinis,' in the chemical sense, occurs also in Alsted's Encyklopädie (1630), p. 2276, and therefore, at least, in the authorities employed by this compiler. As to the alchemistical origin of the notion there can be no doubt.

[16] We may here rely upon the case of Boyle, who in his older writings, as in the 'Chemista Scepticus,' still employs the notion of affinity (cp. Kopp, Gesch. d. Chemie, ii. 288), while in the treatise quoted above (n. 13) on the origin of qualities and forms, where he has appropriated the theory of Gassendi (cp. Hist. of Materialism, i. 266, and notes), he avoids the expression.

its use might involve the recognition of a new 'vis occulta.' In France especially there then predominated a repugnance to the term 'affinity,' and St. F. Geoffroy, at that time (1718 and onwards) one of the chief authorities on chemical relationship, avoided its use. Instead of saying, Two united substances are decomposed if a third is added to them which has more relationship to one of the two bodies than they have to each other, he says, If it has more *rapport* to one of them."[17] Thus a word comes in very conveniently, not only where ideas are wanting, but even where there are too many. As a matter of fact, there is nothing more in either expression than an hypostatising of the mere process. The paler expression calls up fewer disturbing associations than the coloured one. This might contribute to the avoiding of errors if ideas and names were, in fact, so dangerous in regard to methodical science. The experience of the history of science as to the notion of affinity shows that the danger is not so great if the objective investigation keeps strictly to its course. The 'vis occulta' loses its mystic charm, and sinks of itself into a mere comprehensive notion for a class of accurately observed and rigidly defined phenomena.

Hitherto, then, the whole transformation of the ancient idea of atoms is nothing but a single broad consequence of the transformation of the principles of mechanism due to the law of gravitation; and even the notion of affinity attaches itself to the service of this new circle of ideas without introducing any really new principle as to the nature of force and matter. Chemical experience only directly touches the conception of the nature of matter when Dalton propounds his theory of atomic weights.

The train of thought by which Dalton was led to the fruitful conception of atomic weights is uncommonly clear and simple. He saw himself led by his studies, like

[17] Gesch. d. Chemie, ii. 290.

the German chemist Richter,[18] to the supposition that chemical combinations take place in definite and very simple numerical proportions. While, however, Richter sprang at once from his observation to the most general expression of the idea, viz., that all natural processes are under the control of quantity, number, and weight, Dalton tried hard to secure a picturable conception upon which these simple numbers of the combining weights might be based, and here it was that Atomism came half-way to meet him. And therefore he says himself incidentally, that in order to explain chemical phenomena, all we require is to draw the *right consequences* from the universally adopted Atomism. If Atomism is true, then we cannot intelligibly represent this striking regularity in the combining weights except by a corresponding grouping of the atoms. If we conceive chemical combination in this way, that one atom of the one substance always unites with one, or two, &c., of the other, then the regularity in the combining weights is completely explained and made intelligible. But then it immediately results that the cause of the *variety in the weights* of the combining masses must lie in the *individual atoms*. If we could determine the absolute weight of an atom, we should have the weight of a definite quantum of the body in question by multiplying the atomic weight by the number of atoms; or, conversely, we could determine, from the weight of the atom and the weight of the given body, the number of the atoms contained in this body by simple division.

In respect of method as well as of the theory of knowledge, it is of interest to see how Dalton's *strictly sensuous* mode of conception forthwith made its way, while the more speculative idea of Richter rather hindered the spread of his extremely important discoveries. It is nowhere so

[18] Full details as to Richter and his discoveries are given by Kopp, Entwickel. d. Chemie, in the Gesch. d. Wissensch. in Deutschl., München, 1873, S. 252 ff.

clear as in the history of modern chemistry how sensuous intuition, as an indispensable necessity for the taking of our bearings in phenomena, ever afresh reasserts itself, and almost always attains brilliant results, often as it may have been shown, too, that all these modes of conception are merely helps to the constant establishing of causal connection, and that every attempt to find in them a definitive knowledge of the constitution of matter immediately breaks to pieces on new demands which compel us to reconstruct from its foundations the edifice of these views.

Very soon after the decisive victory of the atomic theory of Dalton, the ground was prepared by new discoveries and speculations for an important modification of the view, which, however, was only able to assert itself generally after a long period of non-recognition. Gay-Lussac's discovery in 1808 that the various gases under equal pressures and equal temperatures combine in *simple volumetric proportions*, and that the volume of such a combination stands in a very simple relation to the volume of its constituents, must have been a fresh challenge to the acumen of theorists, just as had been previously the discovery of the regularity in atomic weights. And just in the same way as Dalton had then been led, namely, by seeking for a sensuously picturable mode of conceiving the cause of this relation, so Avogadro reached his important *molecular theory*. He found (1811) that the similarity in the relations of all gases towards pressure and temperature and in chemical combination cannot be explained, except by the supposition that the *number of smallest particles* in an equal volume of different gases (under equal pressures and temperatures) is the *same*. But in order to carry out this view consistently he had not only to suppose for compound gases a union of several atoms in their smallest particles, but the smallest particles also of the *simple* gases must, at least partially, be regarded as combinations of several

atoms.[19] Thus the *molecules* in many respects occupied the position of atoms; only that they were not simple, but were compounded of the atoms. The smallest particles of a chemical body, then, were molecules; the smallest particles of matter generally were atoms. Only in chemical combinations and separations the atoms come forward, as it were, independently, changing their place and grouping themselves into molecules of altered composition.

Avogadro's hypothesis could not make way beside the immense impulse which was being given meanwhile to the knowledge of chemical facts. Berzelius had accepted Dalton's theory, and supplemented it by supposing that the reason of their various affinities must be sought in the *electrical* relations of the atoms. This theory might for a long time be found satisfactory, and all the zeal of inquirers turned towards analysis. With rapid march the young science conquered the respect of scientific men and the reverence of manufacturers. It had become a power while its foundations were still so doubtful that eminent chemists could doubt whether they were quite justified in claiming for their field of activity the name of a science.

The first discoveries of importance in point of principle were not able to shatter the growing dogmatism of the electro-chemical theory. Dulong and Petit found in 1819 that for simple bodies the specific heat is inversely proportional to the atomic weight—a discovery the fortunes of which exhibit the model of the transformations of an empirical law which has never yet been raised to the rank of a true law of nature. Contradictions, maintenance of the too striking core which no chance could explain, modifications and desperate hypotheses of all kinds gathered around this theory, without the gaining of any adequate

[19] For Avogadro's hypothesis compare Lothar Meyer, Die Modernen Theorien der Chemie und ihre Bedeutung für die chemische Statik, 2 Aufl., Breslau, 1872, S. 20 ff. And besides Weihrich, Ansichten der neueren Chemie, Mainz, 1872, S. 8 ff.

insight into the inner reason of the rare but significant connection. The circumstance that the atomic weights here for the first time became more than mere matters of fact, and were brought into any kind of relation with other qualities of matter, was little regarded so long as no serious defect was felt in the prevailing theory. Mitscherlich's discovery of *isomorphism* in 1819 seemed to afford a glance into the local relations of the atoms; it was, however, in the main only regarded as a wished-for confirmation of the universally accepted atomistic theory. When it was next further discovered that substances of like constituents appear in very different crystalline forms (dimorphism), when it was found that there are bodies which differ in all their chemical and physical properties, even in the specific weight of the gases, whilst they still consist of like quantities of like elements (isomerism), then people saw themselves compelled to have recourse to transpositions and various groupings of the atoms, without as yet possessing any definite principle for these combinations. The rapid development of organic chemistry soon led to such an accumulation of these bold combinations that sober men of science became very uncomfortable.

To all this there was added the fact that the untenableness of the electro-chemical theory became with the progress of science every day more clear. A period of doubt and hesitation was inevitable. The *type-theory*, which in its improved shape had led to the ideas as to the grouping of the atoms in the molecules, being brought at last into a sure path, began by rejecting all speculations as to the constitution of matter, and by simply keeping to the fact that in a body of a certain type of composition *substitutions* of one element for another may occur in accordance with certain rules. Liebig declared in an 'Essay on the Constitution of Organic Acids' (1838) that "we know nothing as to the condition in which the elements of two compound bodies are, so soon as they have united in a chemical combination, and the way in which we conceive

these elements as grouped in the combination rests merely upon a convention which has been consecrated by habit under the prevailing theory." [20] Schönbein expressed himself still more sceptically in an essay in the 'Album of Combe-Varin:' "When ideas are wanting, a word comes in very conveniently, and assuredly in chemistry since Descartes a gross misuse has been made of molecules and their grouping, under the delusion that by such playings of the imagination we can explain absolutely obscure phenomena and deceive the understanding."

In fact, these "playings of the imagination" certainly do not seem to deceive the understanding, but rather to lead it to the maxim which has its foundation deep in the theory of knowledge, that only the rigid carrying out of sensuous picturability can protect our knowledge against the much more dangerous playing with words. A rigidly carried out intuition, even if it is false in itself, often serves to a great extent as a picture and temporary substitute for the true intuition, and it is always by the laws of our sensibility itself, which are not without relation to the laws of the objective world of phenomena, kept within certain bounds. But so soon as we operate with words to which there are no clear notions, to say nothing of intuitions to correspond, it is over with all sound knowledge, and opinions are produced which have no value whatever, even as steps towards the truth, but will have to be absolutely set aside.

The employing of the imagination to arrange our thoughts as to material processes is, therefore, in fact, more than mere play, even when, as in this period of chemistry, a general hesitation and groping produces the impression of uncertainty. On the other hand, indeed, even if this groping about ceases, if a sure and generally trodden, and for the present safe enough, path has been found, it is still very far from affording us a guarantee that our assumptions correspond with facts.

[20] Kopp, Entwickel. d. Chemie, S. 597.

With admirable clearness Kekulé attempted, in his 'Lehrbuch der Organischen Chemie,' 1861, to recall the chemists to consciousness of the borders between hypothesis and fact. He shows that the proportional numbers of combining weights have the value of *fact*, and that the symbols of chemical formulas may be regarded as the simple expression of this fact. "If to the symbols in these formulas another meaning is assigned, if they are regarded as denoting the atoms and the atomic weights of the elements, as is now most common, the question arises, What is the (relative) size or weight of the atoms? Since the atoms can be neither measured nor weighed, it is obvious that we can only be led by reflection and speculation to the hypothetical assumption of determinate atomic weights."

Before we see now what the latest period of chemistry (which again, full of confidence, follows a highly developed theory) proposes to do with matter, it is time to take a glance at the views of the mathematicians and physicists.

That modern physics also must rest upon the Atomic theory is an obvious consequence of the historical development. Gassendi, Descartes, Hobbes, and Newton all started from a physical view of the world; and with Boyle, and even Dalton, physical and chemical research go hand in hand. Yet the paths of physics and of chemistry separated from each other in the same measure as mathematical analysis could make itself master of physics, while the facts of chemistry for a time remained inaccessible to it.

Almost simultaneously with Dalton's chemical atomic theory, the long unrecognised undulation theory made a way for itself in optics—with difficulty enough, because of the prejudices which maintained the emission theory of light. Young's demonstration of the number of vibrations for the different colours belongs to the year 1801. Fresnel received in 1819 the prize of the Academy at Paris for his labours on the refraction of light. After this the theory of light became more and more a mechanism of the

æther-atoms; but the idea of the atom had to submit patiently to all the modifications brought about by the necessities of calculation. The strongest of these modifications—although at bottom only the last consequence of the transcendental theory of gravitation—was the denial of any and every kind of extension in the atoms. As early as the middle of the eighteenth century this idea had occurred to the Jesuit Boscovich.[21] He found contradictions in the doctrine of the impact of the atoms, which could only be solved by supposing that the effects which are usually ascribed to the resilience of material particles are due to repulsive forces acting from a point situated in space, but without extension. These points are regarded as the elementary constituents of matter. The physicists who belong to this school describe them as 'simple atoms.'

However well Boscovich had already carried out this theory, it was only in our own century that it found wider approval amongst the French physicists, who occupied themselves with the mechanism of atoms. The rigid logical sense of the French scientific men must, in fact, speedily have discovered that in the world of modern mechanical philosophy the atom, as an extended particle, plays a very superfluous part. As soon as the atoms no longer, as with Gassendi and Boyle, acted immediately upon each other by their bodily mass, but by forces of attraction and repulsion, which stretched through empty space, as between the stars, the atom itself had become a mere bearer of these forces, in which there was nothing essential—a bare substantiality excepted—that would not have found its complete expression in these very forces. Was not all influence, even the influence upon our senses, brought about by the unsensuous forces constructed in empty space? The tiny particle had become an empty tradition. It was still retained, indeed, merely because of its similarity to the great bodies which we can see and touch. This palpable character seemed to afford, moreover, a guarantee

[21] Fechner, Atomenlehre, 2 Aufl., S. 229 ff., Leipzig, 1864.

of the sensuous element, such as it exists in really sensible things. But when clearly regarded, even this seizing and handling, to say nothing of seeing and hearing, according to the mechanical philosophy based upon the theory of gravitation, is no longer brought about by direct material contact, but simply by means of these entirely unsensuous forces. Our Materialists hold fast to the sensible particle just *because* they *want* to have a sensuous substratum to the unsensuous force. With such cravings of the mind the French physicists could not trouble themselves. There seemed no longer to be scientific grounds for the extendedness of the atoms; why, then, further hamper ourselves with the useless conception?

Gay-Lussac conceived the atoms, on the analogy of the vanishing magnitude of the differential, as infinitely small in comparison with the bodies compounded from them. Ampère and Cauchy regarded the atoms as in the strictest sense unextended. A similar view was expressed by Seguin, and Moigno concurs with him, and would only prefer, with Faraday, simple force-centres, instead of extensionless bodies.

Thus, then, we should have found our way by the mere development of Atomism into the dynamical conception of nature, and that not by means of speculative philosophy, but of the exact sciences.

It has a peculiar charm for the quiet observer to see how the talented natural philosopher and physicist, to whom we are indebted for these notices of Ampère, Cauchy, Seguin, and Moigno,[22] is himself situated towards Atomism. Fechner, the sometime disciple of Schelling, the editor of the mystical and mythical Zend-Avesta, Fechner, who is himself a living proof that even an enthusiastic philosophy does not always corrupt the spirit of true research, has actually employed his atomic theory to indite a challenge to philosophy, by the side of which even

[22] Fechner, Atomenl., S. 231 ff.

Büchner's utterances may seem somewhat flattering. He obviously, indeed, confounds philosophy in general with that kind of philosophy through which he himself has passed. All the ingenious applications of Fechner, the numerous imaginative images and similes, the acute arguments, come at last merely to this, that Fechner looks for every philosopher at the fireside he once haunted himself.

In fact, the whole controversy between philosophy and physics, as Fechner conceives it, is properly an anachronism. Where should we look in these days for the philosophy which could make any serious pretension to forbid physicists their atomism? We leave here entirely out of account the fact that Fechner's "simple" atoms are at bottom no longer atoms; that a construction of the universe out of force-centres without any extension must, strictly considered, be reckoned with *dynamical* views. Even to that dynamism, which starts from the denial of empty space, Fechner makes such concessions, that it savours, not of philosophy, but shortsighted self-sufficiency, not to be able quietly to conclude peace, so far as regards merely the relation of philosophy to physics.

Fechner gives up not only the indivisibility of the atoms, and ultimately even their extension, but he observes also quite correctly that the physicist cannot venture to assert "that the space between his atoms is absolutely empty; that a fine continuous essence does not rather extend between them, which merely has no further influence upon the phenomena that he can judge of." "The physicist does not speak of such possibilities as are indifferent to him, only because they do not help him. But if they can help the philosopher in any way, then it is his business to regard them. And it were a sufficient service to him if they put him in a position to conclude a treaty with the exact sciences. The physicist only uses atoms primarily, not ultimately. If the philosopher concedes his atoms to the physicist primarily, the latter can readily

concede to him his full space ultimately. The two things are not contradictory." [23]

Of course not. So long as we thus rigidly sunder the two provinces, he must be a curious philosopher (though we may always possess a few such in Germany) who would contest with the physicist the *primary, i.e.*, the *technical* use of Atomism. Such a contest would have, indeed, no logical —and therefore, it may be hoped also, no philosophical— meaning, except in so far as the philosopher himself becomes a physicist, and by special employment of experiment and equations shows how it might be better done. The bare assertion, it must be so, because it is rational, despite the pretensions it contains, does not go so far as to contest the primary use of Atomism; for the philosopher who should postulate a system of physics on his own principles, can still not deny that the way in which things are realised is sometimes a different one; and this way has its justification only in its success. One must be able to do things better, or quietly look on and see how they are done; for the specialist, who remains consistently at Fechner's standpoint, cannot deny, too, that his task may perhaps some day be regulated just as well, if not better, on other principles. But with this possibility he does not trouble himself, so long as nothing crops up on his successful course that compels him objectively to turn into another path.

But does Fechner himself in his Atomism keep to the standpoint of the physicist? By no means. The passage just cited is taken from the first part of his work, in which he sets forth the physical theory of atoms, just as it is taught in the exact sciences. His own view of the 'simple' atoms, on the other hand, he himself reckons as belonging to 'philosophical' Atomism. The advantage of his standpoint he sees only in this, that here the Atomism of the Physicists tapers, as it were, into philosophy, and in its extreme consequences contains a philosophical conception,

[23] Atomenl., S. 76, 77.

while the view of the "philosophers" combated by him is in contradiction with empirical inquiry. We have, then, exactly as in the case of Büchner, a theory of things sprung up on the soil of natural inquiry, which declares war upon all "philosophy," while it nevertheless gives itself out as philosophy. The enigma is solved if we assume that it is the philosophy of the *professor of physics* which here asserts itself against that of the *professor of metaphysics*—a controversy which cannot any longer concern us, as we do not recognise any such guild of philosophers, and, so far as they try to assert themselves in our own day, must deny them any scientific importance.

The philosopher Fechner comes to terms with the physicist Fechner, when the latter requires extended particles, very simply; the extended particles are then, just like the molecules of the chemists, themselves again compounded bodies. In fact, there are, too, in physics, as in chemistry, other empirical reasons which do not admit of our referring such visible bodies without any middle terms directly to unextended force-centres. Redtenbacher, who has done admirable service in the mathematical theory of molecular movements, constructs his molecules from "dynamids." By these he understands corporeal, gravitating, and extended atoms, which are surrounded by an atmosphere of discrete æther particles, endued with repulsive force. In relation to these, therefore, the corporeal atom is not only extended, but must, in fact, be conceived as extraordinarily large. The reason that determines him to reject Cauchy's punctual atoms lies in the necessity of supposing for the vibrations of corporeal atoms in various directions a varying elasticity in them.

"As we presuppose a system of dynamids with axes of elasticity, we must necessarily regard the atoms as tiny particles of definite if unknown form, for only if the atoms possess axial form, and are not mere points or spheres, can there exist in a state of equilibrium an unlike elasticity in different directions? Cauchy bases his investigations upon

a medium consisting of corporeal points, but at the same time supposes that the elasticity about each point is different in different directions. This is a contradiction, an impossibility, and hence a weak side of Cauchy's theory." [24]

But if now we wish to avoid the assumption—one little agreeable to our understanding—that there are bodies which, in relation to others (the æther particles), are infinitely large and yet utterly indivisible, we find a simple way out of it by regarding the corporeal atom, which forms the core of the dynamid, merely as *relatively* indivisible, that is to say, as indivisible so far as our experience and our calculations require. It may then possess axial form, and again be composed of infinite, infinitely smaller, under-atoms of similar form. This assumption may, without demanding any serious change, run through all Redtenbacher's calculations. It is harmless metaphysic, and can neither bring about nor prevent any discovery. And if, for the convenience of the physicist, we agree to treat the relatively empty space as absolutely empty, the relatively indivisible body as absolutely indivisible, everything remains as it was. The mathematician, in particular, who is accustomed to leave out of his calculation the higher powers of an infinitely small magnitude, can have no reason to demur.

But the thing must still stop somewhere, says ordinary common sense. Good; but it is just the same as in all dealing with infinity. Science leads us to the idea of the infinite; our natural feelings struggle against it. Upon what this struggle is based it is hard to say. Kant would attribute it to the efforts of the reason after unity, which come into conflict with the understanding. But these are merely names for an unexplained fact. Man has not two different organs, understanding and reason, related to each other like eye and ear. It is, however, certain that judgment and inference lead us on from one step to another,

[24] Redtenbacher, Das Dynamidensystem, Grundzüge einer mechanischen Physik, Mannh., 1857, S. 95 ff.

and bring us at last to the infinite, while we feel need of some conclusion—a need which comes into conflict with these endless inferences.

Büchner, in his work 'Ueber Natur und Geist,' makes the philosophical Wilhelm—who is, of course, a simpleton—advocate the idea of infinite divisibility. But Augustus, who understands something of natural science, answers him with the following oracular utterance:—

"You trouble yourself with difficulties which are more speculative than practical." (Observe, this is a discussion which is wholly and entirely speculative.) "Though we are not in a position to place ourselves in thought at the farthest point, at which matter is no more divisible, yet there must somewhere be a limit to it." There is, indeed, nothing like a vigorous faith! "To suppose an infinite divisibility is absurd; it means to assume nothing, and to throw doubt upon the existence of matter at all—an existence which no unprejudiced person can successfully deny."

It cannot be our duty to defend Ampère against Büchner, especially as Büchner himself in 'Force and Matter' declares atom to be a mere expression, and admits infinite smallness. We must rather ask ourselves how it comes to pass that, in the light of our contemporary physics, such an idea of matter as Büchner's 'Augustus' regards as necessary can still exist? A professed physicist, even if he assumes extended atoms, will not easily fall into the mistake of making the *existence* of what we in daily life and in science call matter dependent upon the existence of extended particles. Redtenbacher, for instance, asserts against Cauchy merely his axes of elasticity, but not the reality of matter. On the other hand, we must not blink the fact that Büchner's 'Augustus,' as the author probably intended, expresses the views of almost all unscientific persons who have more or less concerned themselves with these questions. But the reason of this may lie in the fact that they cannot sufficiently free themselves from the sensuous idea of compound, apparently compact, bodies,

such as our touch and eye present them to us. The professed physicist, at least the mathematical physicist, cannot make the least step in his science without freeing himself from such ideas. Everything as it appears to him is an effect of forces, and matter forms a subject for these forces, which is in itself quite empty. But force cannot be at all adequately represented in forms of sense: we help ourselves by pictures, such as the lines of the figures in the doctrines of mathematics, without ever confounding these pictures with the notion of force. How this constant habituation to an abstract mental conception of force easily passes over with the specialist, into the notion of matter, may be shown us by the example of a physicist whose name reflects special glory upon German science.

W. Weber, in a letter to Fechner,[25] writes thus:—"What is required is, with regard to the causes of motion, to eliminate such a constant part that the remainder is indeed variable, but its variations may be conceived as solely dependent on measurable relations of space and time. In this way we attain to an idea of mass to which the notion of spatial extension is not necessarily attached. Consequently then the magnitude too of the atoms in atomistic modes of conception is measured not at all according to spatial extension, but according to their mass, *i.e.*, according to the relation constant in every atom, in which in this atom the force always stands to its rapidity. The idea of mass (as in the case of the atoms also) is thus no more crude and materialistic than the idea of force, but is entirely equal to it in delicacy and intellectual clearness."

Well, of course, with these speculations, which refine away the nature of mass and of the atom into an hypostasised notion, the latest *doctrines of chemistry*, which have obtained so thorough a success, stand in peculiar opposition. We shall not venture to begin by depreciating these doctrines if we reflect that it is not a mere question of a

[25] Fechner, Atomenl., S. 88 ff.

scientific fashion, but that chemistry, by means of its now ruling views, is just placed in a position to *predict* the existence of as yet undiscovered bodies, according to the requirements of the theory, and thus to a certain extent to proceed deductively.[26] The decisive idea of this new doctrine is that of the atomicity or "quantivalence" of the atoms.

From the development of the type theory, and the observations on the volumetric combination of the elements in the gaseous state, it was collected that there is a class of elements whose atoms only combine with one atom of another element (type hydrochloric acid); another class whose atoms always form a combination with two atoms of another element (type water); a third (type ammonia) whose atoms attach to themselves three other atoms.[27] The atoms in question were called, according to this property, mon-, di-, and tri-atomic, and this classification was found to afford a very valuable starting-point for investigation, since it had been shown that the *substitutions*, that is, the replacing of one atom in a molecule by another, or by a so to say fixed combination of others, might be ordered on the principle of quantivalence, and their possibility predetermined. Thus from simple combinations it was possible, in accordance with a rule, to infer compound and ever more complex ones; and a quantity of organic substances of very complex structure

[26] From the principle of the success in substitution of an atom of methyl in place of an atom of hydrogen, Kolbe inferred the existence and the chemical relations of yet undiscovered combinations, and his predictions were brilliantly justified by subsequent investigations (Weihrich, Ansichten d. neueren Chemie, S. 44). That Kolbe at that time was strongly opposed to the theory of types is here indifferent, as his substitution doctrine was later fused with the corrected theory of types. Lothar Meyer, Die modernen Theorieen der Chemie (2 Aufl., 1872), discusses, *inter alia*, in §§ 181 and 182, far-reaching speculations on the existence and the properties of yet undiscovered *elements*, and deals in the Conclusion to his second edition (esp. S. 360 ff.) with the possibility, but at the same time the difficulties, of a deductive procedure in chemistry.

[27] Cp. the extremely lucid and generally intelligible development of what we can here only briefly indicate in Hofmann's Einleit. in d. moderne Chemie, 5 Aufl., Braunschw., 1871.

has been discovered through taking as the clue the law of quantivalence and the resulting concatenation of atoms.

While before it was only the fact of isomerism that had led to the view that the properties of bodies was not absolutely dependent upon the number and character of the elements appearing in them, but that a difference in the disposition of the atoms must also have some influence, now the mode in which the atoms were combined in the molecules became the main principle of inquiry and of explanation; especially when in carbon yet another element was found with tetratomic atoms (type olefiant gas), to which were speedily added, at least hypothetically, atoms combining by fives and sixes.

With reference to methodology and the theory of knowledge, it is of interest to observe here the curious halting of the chemists between a concretely sensuous and an abstract conception of quantivalence. On the one hand, they hesitate to introduce into this dark sphere fanciful ideas, the agreement of which with the reality could hardly pass even for problematical; while, on the other hand, they are guided by a proper inclination to assume nothing that cannot be clearly represented in one way, or even in various ways, in the forms of sense. And thus they talk of the 'points of affinity' in the atoms, of 'attaching' to them, of 'occupied' and still free points, just as if they saw before them, in the extended and crystal-like body of the atom, such points, *e.g.*, as poles of a magnetically working force; but, at the same time, they protect themselves against the acceptation of such sensuous conceptions, and declare the 'points of affinity' to be a mere phrase for the purpose of embracing the facts. Nay, Kekulé has even attempted to reduce the quantivalence of the atoms, with an entire surrender of the 'points of affinity,' to the "relative number of the impacts which one atom receives from another atom in a unit of time."[28]

This hypothesis has not as yet met with approval, but

[28] Cp. Weihrich, Ans. d. n. Chemie, S. 38 f.

for all that the atoms do receive *impacts*. Here the recent theory of heat shows a striking agreement with chemistry. According to Clausius,[29] the molecules of the gases are engaged in a graduated motion, whose living force is proportional to the temperature. In the fluid state of bodies there exists a motion of the molecules increasing with the temperature, which is strong enough to overcome the attraction of two neighbouring particles, but not strong enough to outweigh the attraction of the whole mass; in the solid state the attraction of the neighbouring particles at length outweighs the impulse of heat, so that the molecules can only change their relative position within narrow limits. This theory, which has grown out of the doctrine of the conversion of heat into active force and back again, no longer needs any æther in order to give a satisfactory solution of all the problems of the theory of heat. It explains in the simplest way the changes in the physical conditions under the influence of heat; but it leaves the condition of solid bodies still rather obscure, sheds a half light upon the condition of fluids, and only as to the condition of perfect gases gives so clear a picture that apparently little more can be desired.

Here again, therefore, the latest theories of chemists and of physicists coincide in starting from the gaseous condition of matter as the most intelligible, and attempting to advance from this point.[30] But here, in the case of the

[29] Clausius, Abhandl. über die mechanische Wärmetheorie (orig. in Poggend. Ann.), Braunschw., 1854 and 1867; Abh. xiv. (ii. 229 ff.); Ueber die Art der Bewegung welche wir Wärme nennen. Clausius there mentions as his immediate predecessor Krönig, who, in his 'Grundzüge einer Theorie der Gase,' started with essentially similar views. He traces, however, in a note the general idea of the increasing motion of the gas-molecules through Dan. Bernoulli and Le Sage back to Boyle, Gassendi, and Lucretius. Clausius himself hit upon his notion without any historical suggestion; but otherwise the co-operation of tradition in this series is unmistakable.

[30] The most noteworthy attempt to turn chemistry in this way into a *mechanism of atoms* is in Naumann, Grundriss der Thermochemie, Braunschw., 1869. In this very clearly written treatise the most essential principles of Clausius' theory may be found in a simplified shape, which avoids the application of the higher mathematics.

perfect gases, the old *mechanism of impact* is, as it were, developed in fresh brilliancy. The universal attraction of matter, together with the other molecular forces which act only at close quarters, are regarded as disappearing, as compared with the gradually increasing heat motion, and this goes on continually until the molecules strike upon other molecules, or upon fixed barriers. The laws of elastic impact here dominate, and the molecules are for simplicity's sake treated as spherical, which, it is true, seems not quite consistent with the requirements of chemistry.

We pass over the numerous advantages which the new theory possesses in offering a natural solution, *e.g.*, for the irregularities of Mariotte's law, for the apparent exceptions to Avogadro's rule, and many similar difficulties. We are chiefly concerned to regard somewhat more closely the principle which here again comes up of the mechanical impact of the molecules and atoms with reference to the question of force and matter.

Here, then, that *picturability* which had disappeared from mechanics since Newton is apparently re-established; and we might, if anything were gained by it, entertain a bold hope that even such cases of *actio in distans* as are still retained by the theory will sooner or later disappear, and be referred to sensuously picturable impact, in the same way as has been done in the case of heat. But, of course, only elastic impact can satisfy the requirements of physics, and this case has its own special difficulties. It cannot, indeed, be denied that the old atomists too, in their theory of the impact of the atoms, must have chiefly had in their minds the notion of elastic bodies; but the conditions under which these passed on their motions to one another were unknown to them, and the distinction between the impact of elastic and unelastic bodies was veiled in darkness to them. As now, their atoms were absolutely *unchangeable;* they could not be elastic either, so that more exact physics stumbled against a contradiction on the very threshold of the system. This contradic-

tion was, indeed, not so obvious as it will appear to us nowadays; for even in the seventeenth century physicists of the first order were very seriously experimenting to find out whether or not an elastic ball, upon impact, suffers a flattening, and therefore a compression.[31]

At present we know that no elasticity is conceivable without dislocation of the *relative positions of the particles* in the elastic body. But from this it unavoidably follows that every elastic body is not only changeable, but also consists of *discrete particles*. The latter proposition can, at most, only be controverted by the same reasons with which Atomism in general is controverted. Exactly the same reasons which from the first have led us to resolve bodies into atoms must also show that the atoms, if they are elastic themselves, again consist of discrete particles, and therefore of sub-atoms. And these sub-atoms? They either resolve themselves into mere force-centres, or if in them again elastic impact has to play any part, they must in turn consist of sub-atoms; and we should again have that process running on to infinity, in which the understanding no more finds satisfaction than the process itself can give way to the understanding.

Accordingly there is already contained in Atomism itself, while it seems to establish Materialism, the prin-

[31] Huyghens discusses, in his treatise De Lumine, Opp. Amstelod., 1728, i. p. 10 sq., the necessity of time for the transmission of the motion of one elastic body to another, and observes: "Nam inveni, quod ubi impuleram globum ex vitro vel achate in frustum aliquod densum et grande ejusdem materiæ, cujus superficies plana esset et halitu meo aut alio modo obscurata paululum, quædam maculæ rotundæ supererant, majores aut minores, prout major aut minor ictus fuerat, unde manifestum est, corpora illa pauxillum cedere deindeque se restituere; cui tempus impendant necesse est." The treatise 'De Lumine' dates from the year 1690, while Huyghens possessed the principles of his law of elastic impulse as early as 1668 (cp. Dühring, Princ. d. Mechanik, S. 163). It is, therefore, not at all improbable that Huyghens deduced his laws of impact from general phoronomical principles *before* he had instituted the experiments here mentioned. This agrees also completely with the mode of establishing the laws of impact (as described by Dühring), which is based, not upon experiment, but upon general considerations.

ciples which break up all matter, and thus must cut away the ground from Materialism also.

Our Materialists have, indeed, made the attempt to secure to matter its rank and dignity, by endeavouring to make the notion of force strictly subordinate to that of matter; but we need only look a little more closely into this attempt to see at once how little is thus gained for the absolute substantiality of matter.

In Moleschott's 'Kreislauf des Lebens,' a long chapter bears the title of 'Force and Matter.' The chapter contains a polemic against the Aristotelian notion of force, against teleology, against the assumption of a supersensuous vital force, and other pretty things; but not a syllable as to the relation of a simple form of attraction or repulsion between two atoms to the atoms themselves, which are conceived as the bearers of this force. We hear that force is not a striking god, but we do not hear how it proceeds in order to produce from one particle of matter, on through empty space, a movement in another. At bottom we only get one myth for another.

"Just that property of matter which makes its movement possible we call force. Primary matter exhibits its properties only in relation to other matter. If this is not in the required proximity, under suitable conditions, then it produces neither repulsion nor attraction. *Obviously here the form is not wanting;* but it withdraws itself from our senses, because the opportunity of motion is wanting. *Wherever, at any time, oxygen may happen to be, it has a relationship to potassium.*"

Here we find Moleschott deep in Scholasticism; his "relationship" is the prettiest *qualitas occulta* that can be wished for. It sits in the oxygen like a man with hands. If potassium comes anywhere near, it is laid hold of; if none comes, at least the hands are there, and the wish to get hold of potassium.

Büchner goes still less than Moleschott into the relation of Force and Matter, although his best-known work

has these words for its title. Just in passing we may mention the proposition: "A force which does not express itself cannot exist." This is at least a healthy view as compared with Moleschott's incarnation of a human abstraction. The best thing that Moleschott gives us about Force and Matter is a long extract from Du Bois-Reymond's Preface to his 'Untersuchungen über thierische Elektricität;' but just the clearest and most important part of it Moleschott has omitted.

In the course of a thorough analysis of the vague conceptions of a so-called vital force, Du Bois-Reymond happens to ask what we represent to ourselves by 'force.' He finds that there are at bottom neither forces nor matter; that both are rather abstractions from things, only regarded from different points of view.

"Force (so far as it is conceived as the cause of motion) is nothing but a more recondite product of the irresistible tendency to personification which is impressed upon us; a rhetorical artifice, as it were, of our brain, which snatches at a figurative term, because it is destitute of any conception clear enough to be literally expressed. In the notions of Force and Matter we find recurring the same dualism which presents itself in the notions of God and the World, of Soul and Body, the same want which once impelled men to people bush and fountain, rock, air, and sea with creatures of their imagination. What do we gain by saying it is reciprocal attraction whereby two particles of matter approach each other? Not the shadow of an insight into the nature of the fact. But, strangely enough, our inherent quest of causes is in a manner satisfied by the involuntary image tracing itself before our inner eye, of a hand which gently draws the inert matter to it, or of invisible tentacles with which the particles of matter clasp each other, try to draw each other close, and at last twine together into a knot." [32]

However much truth these words contain, yet they

[32] Du Bois-Reymond, l.c., Berl., 1848, i. S. xl. ff.

overlook the fact that the progress of the sciences has led us more and more to put force in the place of matter, and that the increasing exactness of research more and more resolves matter into force. The two ideas therefore do not stand so simply as abstractions beside each other, but the one is by abstraction and inquiry resolved into the other, yet so that there is always something left. If we abstract from the motion of a meteoric stone, the body that moved itself remains over. I can take away its form by removing the cohesive force of its particles; then I still have the matter. I can analyse this matter into its elements by setting force against force. Finally, I can break up in thought the elementary substances into their atoms, and then the unitary matter and everything else is force. If now, with Ampère, we resolve the atom too into a *point* without extension, and the forces which group themselves about it, the *point*, "the nothing," must be matter. If I do not go so far in the process of abstraction, then a certain whole remains simply matter, which otherwise appears to me as a combination of material particles through innumerable forces. In a word, the misunderstood or unintelligible remainder from our analysis is always the matter, however far we choose to carry it. What we here understood of the nature of a body we call the *properties* of matter, and the properties we resolve back into "forces." From this it results that the matter is invariably what we cannot or will not further resolve into forces. Our "tendency to personification," or, if we use Kant's phrase, what comes to the same thing, the *category of substance*, compels us always to conceive one of these ideas as subject, the other as predicate. As we analyse the things step by step, the as yet unanalysed remainder always remains as matter, the true representative of the thing. To it therefore we ascribe the properties we have discovered. Thus the great truth, 'No matter without force, no force without matter,' reveals itself as a mere consequence of the principle, 'No subject without predicate, no predicate

without subject;' in other words, we cannot see otherwise than as our eye permits, not speak otherwise than as our mouth is formed, not conceive otherwise than the primary ideas of our understanding determine.

Although, accordingly, the personification lies strictly in the notion of matter, yet the constant personification of force also is involved in the notion of its being an outflow of matter, as it were its tool. It is true, indeed, that no one in a physical investigation seriously imagines force as a hand moving in the air: the tentacles would be more suitable, with which one particle embraces another. What is anthropomorphic in the notion of force still belongs at bottom to the notion of matter, to which, as to every subject, we transfer a part of our *ego*. "We recognise the existence of forces," says Redtenbacher,* "by the manifold effects which they produce, and especially through the feeling and consciousness of our own forces." Through the latter element, however, we give to merely mathematical knowledge only the colouring of feeling, and thus at the same time run the risk of making out of force something that it is not. Precisely that assumption of "supersensuous force" which the Materialists, strictly speaking, prefer to combat, always comes to this, that beside the matter that acts upon other matter, force, we think, moreover, of an invisible person, and so bring a false factor into the calculation. This is, however, never the result of too abstract, but rather of too sensuous a mode of thought. The supersensuous element of the mathematician is exactly the opposite of the supersensuous element with the natural man. When the latter brings in supersensuous forces there is a god, a ghost, or some personal being behind, and therefore a being conceived as sensuously as possible. Personified matter is to the natural man of itself far too abstract, and therefore he pictures in imagination a "supersensuous" person besides. The mathematician may, before he has established his equation, represent the forces pretty much like human

* S. 12.

forces, but he will not therefore incur the risk of bringing a false factor into the calculation. But so soon as we have the equation, then every sensuous conception ceases to play any part. Force is no longer the cause of motion, and matter is no longer the cause of force; there is then only a body in motion, and force is a function of motion.

Thus at least we may bring order and a comprehensive survey into these ideas, even if we can have no perfect explanation what force and matter are. Enough if we can show that our categories have something to do with them. Nobody must ask to see his own retina!

Thus, then, it is intelligible, too, that Du Bois-Reymond does not get beyond the antithesis of force and matter, and we will therefore add the passage omitted by Moleschott, in order to show how advantageously the great inquirer is distinguished from the dogmatic confidence of the Materialists.

"If we ask, What, then, is there left if neither force nor matter possesses reality? those who range themselves with me at this standpoint answer as follows:—It is simply not granted to the human mind in these things to get beyond a final contradiction. We prefer, therefore, instead of revolving in a circle of fruitless speculations, or hewing the knot asunder with the sword of self-delusion, to hold to the intuition of things as they are, to content ourselves, to use the poet's phrase, with the 'Wunder dessen, was da ist.' For we cannot bring ourselves, because a true explanation is forbidden us in one direction, to shut our eyes to the defects of another, for the sole reason that no third explanation seems possible. And we have renunciation enough to accept the idea that in the end the one goal appointed to all science may be, not to comprehend the nature of things, but to make us comprehend that it is incomprehensible. Thus it has finally turned out to be the task of mathematics, not to square the circle, but to show that it cannot be squared; and that of mechanics, not to establish a *Perpetuum Mobile*, but to demonstrate the

fruitlessness of such exertions." To this we add, "And the task of philosophy, not to gather metaphysical knowledge, but to show that we cannot get beyond the circle of experience."

So with the advance of science we become ever more certain in our knowledge of the *relations* of things, and ever more uncertain as to the subject of these relations. Everything remains clear and intelligible so long as we can keep to bodies as they appear immediately to our senses, or so long as we can represent to ourselves the hypothetical elements in them, on the analogy of what appeals to our senses. But theory is always carrying us beyond this, and in explaining the given facts scientifically, in carrying our insight into the connection of things so far as to be able to predict phenomena, we are treading the path of an analysis which carries us on to infinity as much as our conceptions of space and time.

We must not marvel, therefore, that to our physicists and chemists the molecules become ever better known, while the atoms at the same time become ever more uncertain; for the molecules are a complex of hypothetical atoms, which we may conceive without any harm entirely in the fashion of sensible things. If science, which here, indeed, seems to offer us objective knowledge, should ever advance so far as to bring the constituents of the molecules as near to us as the molecules at present are, then these constituents cease to be atoms at all, but are also something composite and variable, as they are already often regarded.

As to the molecules of gases, we already know partly with tolerable certainty, partly at least with great probability, the rapidity with which they move, the mean distance they pass through between every two collisions, the number of collisions in a second, and, finally, even their diameter and absolute weight.[33] That these magnitudes,

[33] Cp. the report of a lecture by the English physicist Maxwell in 'Der Naturforscher,' 1873, No. 45, where at S. 421 is given a table of the figures in question for four different gases.

though subject to many corrections, are not built merely in the air, may be shown by the fact that Maxwell has succeeded in deducing from the same formulæ upon which these estimates rest inferences as to the heat-conducting power of various bodies, which have been brilliantly confirmed by experiment.[34] The molecules are these small masses of matter which we may represent to ourselves on the analogy of visible bodies, and with whose properties we are already partly acquainted by means of scientific inquiry. But they are thus removed from that obscure region in which the true elements of things are hidden. We may maintain that 'Atomism' is proved, if by this we understand nothing more than that our scientific explanation of nature, in fact, presupposes discrete particles which move in at least comparatively empty space. But in this view all the philosophical questions as to the constitution of matter are not solved, but only put aside.

And yet even this separation of matter into discrete particles is by no means demonstrated to the extent that these triumphs of science might lead us to suppose; for in all these theories it is already presupposed, and therefore, of course, appears again in our results. The confirmation of Atomism in this weakened sense can at most be viewed in the same light as perhaps the confirmation of Newton's theory by the discovery of Neptune. The discovery of Neptune, on the basis of a calculation on the Newtonian principles, has rightly been regarded as a highly important, and, in many respects, decisive fact; but nobody will therefore maintain that this confirmation of the system also decides the question whether attraction is an action at a distance or whether it takes place through some medium. Even the question whether Newton's law is absolutely valid or only so within certain limits, whether, *e.g.*, it is modified by a very close approximation of particles or

[34] Cp. Maxwell's lecture just cited, and Klein's Vierteljahrs-Revue der Fortschr. d. Naturwissenschaften, ii. Bd., Köln u. Leipz., 1874, S. 119 ff.

by extremely wide removal of them, is not affected by the discovery of Neptune. Recently an attempt has been made to treat Newton's law as a mere special case of the much more general Weber's formula for electric attraction. Neptune throws no light on this point. Whether gravitation acts instantaneously, or whether it requires some time, however infinitesimally small, to convey its effects from one heavenly body to another, is again a question which is not touched by the most brilliant corroboration of this kind. In all these questions, however, lies the true notion of gravitation, and the generally accepted assumption that it is a rigid and unconditional law of nature, acting instantaneously at all distances, is, in the light of our science of to-day, not even a probable hypothesis.

Thus, even in the modern chemico-physical theory of gases, strictly speaking only *relations* have been demonstrated, not the original *position*. On the principles of the hypothetical deductive method, we can say with Clausius and Maxwell, *if* matter consists of discrete particles, they *must* possess the following properties. If now the necessary consequence of this theory is established by experiment, this by no means amounts to a logical proof of the presupposition. We conclude in the *modus ponens* from the condition to the conditioned, not conversely. If we take the converse proposition, then there is always the possibility left that the same consequences may result from very different presuppositions. The theory which rightly explains, and even predicts, the facts, may, indeed, thus gain so much probability, that for our subjective conviction it comes very near to certainty; but still always only supposing that there can be no other theory which will do the same.

That this can by no means be taken for granted in the mechanical theory of heat, so far as the molecules, at least, are concerned, Clausius has carefully borne in mind, when he expressly observes, in the preface to his famous essays, that the most essential features of his mathematical theory

are *independent* of the conceptions he has formed as to molecular movements.

Helmholtz goes still farther in his 'Rede zum Gedächtniss an Gustav Magnus' (Berlin, 1871). Here he says (S. 12), "As to the atoms in theoretical physics, Sir W. Thomson says very pointedly that their assumption can explain no property of bodies that has not previously been attributed to the atoms themselves." (This applies, of course, to the molecules also.) "In giving my assent to this expression I by no means wish to declare myself against the existence of the atoms, but only against the efforts to derive the foundations of theoretical physics from purely hypothetical assumptions as to the atomic structure of natural bodies. We know now that many of these hypotheses, which in their time found much approval, shot very wide of the truth. Even mathematical physics has assumed a different character in the hands of Gauss, of F. E. Neumann, and their disciples in Germany, as well as of those mathematicians who attached themselves to Faraday in England, Stokes, W. Thomson, and Clerk Maxwell. It has been seen that even mathematical physics is a pure science of experience; that it has to follow the same principles as experimental physics. In our immediate experience we find before us only extended bodies of very various form and composition; and only on such bodies can we make our observations and experiments. Their effects are compounded of the effects which all their parts contribute to the sum of the whole, and if therefore we wish to learn the simplest and most general laws of the masses and matter found in nature, and especially if we wish to free these laws from the accidents of the form, size, and position of the co-operating bodies, we must go back to the laws of the smallest volumes, or, as mathematicians call it, atomic combination. But these are not, like the atoms, disparate and heterogeneous, but continuous and homogeneous."

We pass by the question whether this procedure,

apart from the mathematical treatment for which it must, according to the principles of the differential and integral calculus, be better suited than Atomism, would give us the like or even greater results for the guidance of the mind in the world of phenomena than we owe to Atomism. Atomism owes its successes to the picturability of its assumptions, and so far from therefore depreciating it we might even raise the question, whether the necessity of our atomistic conception might not be deduced from the principles of Kant's theory of knowledge; though this would not forbid the mathematicians, who nowadays love to travel in transcendental ways, to seek their fortune in other paths. That Kant himself, on the contrary, is regarded as the father of 'Dynamism,' by which is meant the dynamism of the continuity theory, need very little affect us, since, however much his Epigoni may have insisted on this continuity-theory, its necessity from the standpoint of the critical philosophy has very little evidence for it, and, as we have said, we might almost try the opposite way with more prospect of success; for the operation of the category in its fusion with intuition always aims at synthesis in an *isolated* object, that is to say, an object which is dissociated in our conception from the infinite links that bind it to everything else. If we bring Atomism under this point of view the isolation of the particles would appear as a necessary physical conception, the validity of which would extend to the whole complex of the world of phenomena, while it would yet be only the reflex of our organisation; the atom would be a creation of the Ego, but for that very reason a necessary basis of all natural science.

We observed above that in our physical and chemical inquiry, the atom becomes the more obscure as clearer light is thrown upon the molecule. This, of course, refers only to the atom in the narrower sense of the word, to the supposed *ultimate* constituent of matter. They always vanish into the inconceivable as the light of research

comes nearer to them. Thus, for instance, Lothar Meyer shows that the number of the atoms contained in a molecule while it is within certain limits uncertain must yet not be estimated too high: even the dimensions of the atoms must not be supposed to be infinitesimal as compared with the molecules. The atoms produce lively motions, &c., within the molecules. But immediately upon this twilight knowledge stands the remark, that these atoms probably "are particles of a higher order than the molecules, but still not the ultimate smallest particles."

"It seems rather that as the masses of greater, and therefore more easily perceptible, extension are composed of molecules—the molecules or particles of the first order of atoms or particles of the second order—so too the atoms in turn consist of combinations of particles of a third higher order.

"To this view we are led by the consideration that, if the atoms were invariable, indivisible magnitudes, we must assume just as many kinds of entirely different elementary matters as we know chemical elements. The existence of some sixty, or even more, fundamentally different kinds of matter is, however, in itself not very probable. It is made more improbable still through the knowledge of certain properties of the atoms, amongst which the mutual relations which the atomic weights of different elements exhibit to each other, especially deserve attention." [35]

It is extremely probable that even the atoms of the third order, although they would be atoms of the unitary primitive matter, would, on a closer inspection, resolve themselves into atoms of a fourth order. But all such processes, which run on *ad infinitum*, show that in these questions we have to do merely with the necessary conditions of our knowledge, and not with the question what things may be in themselves, and without any reference to our knowledge.

If in place of this infinite series we substitute anywhere

[35] Lothar Meyer, Die Modernen Theorieen der Chemie, 2 Aufl., §§ 154, 155.

extensionless force-centres, we give up the principle of picturability.[36] It is a transcendental conception, like action at a distance, and the question whether and how far such conceptions are admissible can nowadays, when such quantities of them meet us, hardly any longer be disposed of by a simple reference to the Kantian principles of the theory of knowledge. We must let those who need such modes of conception have their way, and observe what comes of it. If, as the physicist Mach[37] thinks possible, the hypothesis of a space of more than three dimensions should give us a thoroughly simple explanation of actual phenomena, or if we must conclude, with Zöllner,[38] from the darkness of the heavens and other actual phenomena that our space is non-Euklidean, then the whole theory of knowledge must be subjected to an entire revision. For this there are as yet no peremptory reasons;

[36] Completely futile is the objection of Büchner's Augustus (Natur. u. Geist, s. 86), that it is utterly impossible to understand how from unextended incorporeal elements there can result matter and bodies filling space, or how matter can come from force. It is not even necessary that matter should *come* if force is in a position to produce upon our senses—that is, upon the force-centres which finally take up our sense-impressions, such an impress as to result in the conception of bodies. That this conception is something different from its cause, and that we have extended and homogeneous bodies at all merely *in this conception*, must indeed be admitted also by the atomist, who resolves bodies into atoms which are no way contained in our notion of bodies. That the bodies in themselves also, independently of our conception, may consist of simple atoms, Fechner tries to show: Atomenl. 2 Aufl. S. 153. Here appears, however, as in Fechner's whole conception, and essentially even in Demokritos, a new principle which makes things and their properties result from atoms—that of constellation in a whole. But this very principle a deeper-going criticism must regard as being primarily based merely in the subject.

[37] Cp. Mach, Die Geschichte und Die Wurzel des Satzes von der Erhaltung der Arbeit: Prag, 1872. On p. 36 he says, "The reason why no one has hitherto succeeded in establishing a satisfactory theory of electricity lies, perhaps, in the fact that all have sought to explain electrical phenomena in every case by molecular processes in a space of three dimensions." And again, on p. 55, "My attempts to explain mechanically the spectra of chemical elements, and the fact that this theory was contradicted by experience, confirmed me in the view that chemical elements should not be represented in a space of three dimensions."

[38] Zöllner, Die Natur d. Kometen, S. 299 ff.

but even the theory of knowledge must not become dogmatic. Let every one take care how he proceeds! He who holds fast to picturability falls into the process *ad infinitum;* he who abandons it leaves the sure ground from which hitherto all the progress of science has been developed. Between this Scylla and Charybdis we can hardly find a safe path.

Of essential influence upon our judgment as to the relation of force and matter is the law, which has in recent times become so conspicuous and important, of the persistence of force. We may conceive it in various ways. We may assume that the chemical elementary substances have certain invariable qualities, with which the general mechanism of the atoms co-operates in order to produce phenomena; but, again, we may suppose that even the qualities of the elements are only certain forms which, under like circumstances occur in like manner, of the universal and essentially unitary motion of matter. So soon, for instance, as we regard the elements as mere modifications of a homogeneous primary matter, this latter view becomes a matter of course. Of course, in this strictest and most consequent sense the law of the persistence of force is anything but proved. It is only an 'ideal of the reason,' which, however, cannot well be dispensed with as the ultimate aim of all empirical investigation. Nay, we may assert that just in this widest sense it may claim, too, an axiomatic validity. But then the very last remnant of the independence and dominance of matter would be gone.

Why is the law of the persistence of force in this sense so incomparably more important than the law of the persistence of matter, which Demokritos enunciated as an axiom, and which, as the 'indestructibility of matter,' plays so important a part with our modern Materialists?

The explanation is, that in the present state of the natural sciences matter is everywhere the unknown, force the known, element. If instead of force we rather talk of a 'property of matter,' we must beware of a logical circle!

A 'thing' is known to us through its properties; a subject is determined by its predicates. But the 'thing' is, in fact, only the resting-place demanded by our thought. We know nothing but properties and their concurrence in an unknown something, the assumption of which is *a figment of our mind*, though, as it seems, an assumption made necessary and imperative by our organisation.

Dubois's famous 'iron-particle,' which is assuredly the same 'thing,' "whether it traverses the universe in an aërolite, dashes along the metals in an engine-wheel, or runs in a blood-cell through the temples of a poet," is only "the same thing" in all these cases, because we leave out of view the peculiarity of its position towards other particles and the resulting reactions; and, on the other hand, regard as constant other phenomena, which we yet know only as forces of the iron-particle, because we know that in accordance with fixed laws we can always reproduce them. We must first have solved for us the enigma of the parallelogram of forces, if we are to believe in the persistent thing. Or is a force, which moves with the intensity x in the direction $a - b$ also certainly the same thing, if its effect has coalesced with another force into a resultant force of the intensity y and the direction $a - d$? Yes, certainly, the original force is still preserved in the resultant form, and it continues to be preserved even if, in the everlasting vortex of mechanical reactions, the original intensity x and the direction $a - b$ never appear again. From the resultant force I can again take out as it were the original force, if I destroy the second composing force by an equally great one in an opposite direction. Here, then, I know precisely what I must understand by the persistence of force, and what I must not understand. I know, and I must know, that the notion of *persistence* is only a convenient mode of conception. Everything persists, and nothing persists, just as I regard the facts. The actual facts lie only in the equivalents of force which I make to persist through calculation and observation. The equiva-

lents are, as we have seen, also the only real actual fact in chemistry; they are expressed, discovered, calculated by weights, that is, by forces.

Our modern Materialists do not love to deal with the law of the persistence of force. It comes to us from a quarter to which they have not much turned their attention. Although the German public, when the Materialistic controversy broke out, had been acquainted for many years with this important theory, we find scarcely a syllable about it in the most important controversial writings. The fact that Büchner later certainly took up the law, and devoted a special chapter to it in the Fifth Edition of his "Force and Matter," is only a new proof of the activity and many-sidedness of this critic; but it will be in vain to look in him for entire clearness as to the range of this law, and as to its relation to the doctrine of the indestructibility of matter. As to the dogmatic Materialists, who, however, in our time are everywhere and nowhere, by this doctrine of the persistence of force the very ground is cut from beneath their feet.

The true element in Materialism—the exclusion of the miraculous and arbitrary from the nature of things—is by this law established in a higher and more general way than they can establish it from their standpoint; the untrue element—the erection of matter into the principle of all that exists—is by it entirely, and as it would seem definitively, set aside.

It is therefore not to be wondered at, although at the same time not to be entirely approved, that one of those who have best handled the doctrine of the persistence of force almost comes back again to the Aristotelian notion of matter. Helmholtz says, in his 'Abhandlung über die Erhaltung der Kraft,' literally as follows:—

"Science regards the objects of the external world according to abstractions of two kinds: according to their mere existence, apart from their effects on other objects or our senses as such it calls them matter. The exist-

ence of matter in itself, therefore, is peaceful and inoperative; we distinguish in it distribution in space and quantity which is treated as eternally invariable. Qualitative distinctions we must not attribute to matter in itself; for if we speak of different kinds of matter, we always assign their difference merely to the difference of their effects, that is, to their forces. Matter in itself, therefore, cannot admit of any other change than one in space, that is, motion. The objects of nature, however, are not inoperative; indeed, we attain to the knowledge of them at all only through their effects, which exhibit themselves on our sense-organs, while we conclude from these effects to a cause of the effects. If, then, we wish to apply the notion of matter in reality, we may only do this by again attributing to it by a second abstraction" (more correctly by a necessary act of imagination, a personification forced upon us psychologically) "what we just before wished to abstract from it, namely, the power to exercise effects, that is, by attributing to it forces. It is obvious that the ideas of matter and force, as applied to nature, *can never be separated.* Pure matter would be indifferent to the rest of nature, because it could never determine any change in nature or in our sense-organs; pure force would be something that must *be* (*dasein*), and yet again not *be, because we call the existent matter—weil wir das daseiende Materie nennen.* It is just as inaccurate to try and explain matter as something real, and force as a mere notion to which nothing real corresponds; both are rather abstractions from the real, formed in exactly the same way. We can perceive matter only through its forces, never in itself."[39]

[39] Helmholtz, Ueber die Erhalt. der Kraft, eine physikal. Abhandl., vorgetr. in der Sitzung d. physikal. Gesellsch. zu Berlin, 23 Juli 1847. This strictly scientific essay, after the works of Mayer the first treatment of the principle of the persistence of force that appeared in Germany, must not be confounded with the popular essay with the same title in the Second Part of the "Popular Lectures" of Helmholtz. The passage in question is at S. 3, 4.

Ueberweg, who loved to indicate his dissent in marginal annotations, has in every copy of this essay, opposite to the words, "weil wir das daseiende Materie nennen," quite rightly observed, "*vielmehr Substanz*"—*rather substance.* In fact, the reason why we cannot suppose a pure force is only to be sought in the psychological necessity by which our observations appear to us under the category of substance. We perceive only forces, but we demand a permanent representative of these changing phenomena, a substance. The Materialists naïvely assume the unknown matter as the only substance; Helmholtz, on the other hand, is quite conscious that we have to do here merely with an *assumption* which is demanded by the nature of our thought, without being valid for absolute reality. It makes little difference, therefore, that in this assumption he puts matter instead of the substance, which he presupposes, however, to be without qualities. His standpoint is essentially that of Kant; but so far as the passive and inoperative nature of matter is concerned, this relapse into the Aristotelian definition might be avoided by adopting a relative idea of matter. This involves also a relative idea of force; and we may be permitted, as the conclusion of this inquiry, to submit here a trio of correlative definitions.

Thing we call a connected group of phenomena, which we conceive as a unity by abstracting their wider relations and internal changes.

Forces we name those properties of the thing which we have discovered by definite effects upon other things.

Matter (Stoff) we call that element in a thing which we cannot or will not further analyse into forces, and which we hypostasise as the origin and bearer of the observed forces.

But have we not, after all, adopted a vicious circle in these explanations? Forces are properties, not of a self-existent matter, but of 'the thing,' and therefore of an abstraction. Do we not, therefore, put into the most concrete, the matter, something that is only the abstraction

of an abstraction? And if now we take force in the *strictly physical sense*, is it not a function of the mass, and therefore of matter?

To this we must reply, in the first place, that the notion of mass in mathematical physics is nothing more than a number. If I express the work that a force can accomplish in foot-pounds, the co-efficient, which denotes the height to which anything is raised, is combined with a co-efficient which denotes the weight. But what else is weight than an effect of gravity? We conceive the weight of the whole body as analysed into the weights of a number of hypothetical points, and the sum of these weights is the mass. There is nothing more involved in this notion, and can be nothing more involved. We have therefore only resolved the given force into a sum of hypothetical forces, as to the bearers of which everything applies that we have said above of the atoms. With the assumption of these bearers, which we can neither dispense with nor understand, we have reached the *limit of natural knowledge* that we discussed in the previous chapter.

Fechner[40] has attempted to give matter a meaning independently of force, by explaining it to be what makes itself known to the feeling of touch as the 'palpable,' against the somewhat obvious objection that this palpability rests merely upon the force of resistance (we may in strictly mechanical sense describe it as work done); he appeals to the fact that resistance would be first inferred from relations of touch and other sensations, and is therefore not an empirical (that is, *one* given in *immediate experience*) basis of the idea of matter. But in this immediate experience of the individual sensation, from which Fechner starts, even the scientific notion of matter is not yet to be found. We have nothing but the subjective side of the sensation, which is a mere modification of our condition, and the objective which we can describe quite

[40] Cp. Atomenl., cap. xv. and xvi., especially S. 105 f., and with reference to the notion of force, S. 120.

generally as relation to an object. But this 'object' is in the natural psychological development primarily but a *thing*, and only by reflexion on the apparently changing properties of one and the same thing can the conception arise of matter that persists in all changes. But the same process of necessity develops also the conception of the forces of this matter. And thus even in the psychological solution of the notion of matter we can find no safe anchorage, leaving aside the fact that the decision of the question does not lie here, but in the attempts to discover what still remains of our traditional notions, when they are analysed by the keenest methods of scientific thought.

There is more solidity in Fechner's attack upon the notion of force. The only object of physics, he shows, is the visible and palpable in space, and the laws of its motion. "Force is in physics nothing more than an expression to represent the laws of equilibrium and motion, and every clear apprehension of physical force resolves itself into this. We speak of the laws of force; yet, if we look closer, they are only the laws of equilibrium and motion, which are valid when matter is compared with matter." If here we put things again instead of matter, there is little to object to in this. In fact, it never at all occurs to us to hypostasise force itself instead of matter, and to draw the conclusion—because all that we know in things may be expressed in terms of force, and matter is only a contradictory residue of our analysis, we assume that force has an independent existence. It is enough for us to know that force is a mere 'expression' of absolute applicability, compared with which, so far as our analysis extends, the 'expression' matter retreats into the infinite or the incomprehensible.

If we try to define force as the 'explanation of movement,' this is only to substitute one expression for another. There is no 'explanation' of movement beyond the equivalents of vital and elastic forces, and these equivalents denote a mere relation of phenomena. According to

Fechner, the explanation of movements lies in the law; but is not the law ultimately but an 'expression' for the totality of the relations amongst a group of phenomena?

That the notion of matter even to its incomprehensible residue can not only be reduced to that of force, but that it must also arise again synthetically from these elements, is shown by an interesting example in Zöllner. The question is whether a modification of Newton's laws of motion, in the sense of Weber's law of electricity, cannot be deduced from the assumption that the effects do not pass from one point to another instantaneously, but with a certain expenditure of time; and it is remarked that Gauss had already made an attempt at a 'translatable conception' of such a propagation of force through space, without, however, succeeding. Recently, again, the mathematician C. Neumann has endeavoured to solve this problem by very simply making the potential values, and therefore the mathematical expression for pure quantities of force, transmit themselves through space. This is obviously to cut asunder with the sword the Gordian knot of the 'translatableness' of the conception. We have a supplementary force, the bearer of which is no longer matter, but the mere formula, as if we were to say motion is what moves itself in space. But Zöllner shows quite justly that the mere fact of the hypostasising of this independently moving potential value comes absolutely to the same thing, as if we should make material particles move from one body to another. In fact, we need only attribute to the abstract ideas of force and motion an independent existence, and we turn them at once into *substance*, and substance in the scientific view completely coincides in this case with 'matter.'[41]

We cannot ask a clearer proof that the whole problem of force and matter runs into a problem of the theory of knowledge, and that the natural sciences can only find

[41] Zöllner, Die Natur der Kometen, S. 334–337.

sure ground in *relations*, while certain bearers of these relations (as, for instance, atoms) may be hypothetically introduced and treated as actual realities; always, of course, supposing that we do not erect these 'realities' into a dogma, and that we leave the unsolved problems of speculation to stand where they stand, and as what they really are, that is to say, *problems of the theory of knowledge.*

Second Book

Continued.

HISTORY OF MATERIALISM SINCE KANT.

SECOND SECTION

Continued.

THE NATURAL SCIENCES.

CHAPTER III.

THE SCIENTIFIC COSMOGONY.

ONE of the most important questions in ancient Materialism was the question of the natural cosmogony. The much-ridiculed doctrine of the endless parallel motion of the atoms through infinite space, of the gradual entwinings and combinations of the atoms into solid and fluid, living and lifeless bodies, for all its singularity, had still a great work to accomplish. And beyond doubt these ideas have had a mighty influence upon modern times, though the connexion of our natural cosmogony with that of Epikuros is not so clear as the history of Atomism. It is rather the very point which subjects the ancient ideas to the first decisive modification, from which that idea of the origin of the universe was developed, which, despite its hypothetical character, even yet has the utmost importance. Let us hear Helmholtz on this point.

"It was Kant who, feeling great interest in the physical description of the earth and the planetary system, had undertaken the laborious study of the works of Newton; and, as an evidence of the depth to which he had penetrated into the fundamental ideas of Newton, seized the masterly

idea that the same attractive force of all ponderable matter which now supports the motion of the planets must also aforetime have been able to form the planetary system from matter loosely scattered in space. Afterwards, and independently of Kant, Laplace, the great author of the 'Mécanique Céleste,' laid hold of the same thought, and introduced it among astronomers." [42]

The theory of gradual condensation possesses the advantage that it admits a calculation, which through the discovery of the mechanical equivalent of heat has reached a high degree of theoretical perfection. It has been calculated that in the transition from an infinitely slight density to that of the present heavenly bodies as much heat must be produced from the mechanical force of attraction of the particles of matter, as if the whole mass of the planetary system were expressed 3500 times in pure coal and this mass were then burned. It has been inferred that the greatest part of this heat must have lost itself in space before the present form of our planetary system could arise. It has been found that of that enormous store of mechanical force of the original attraction only about the 454th part is maintained as mechanical force in the motions of the heavenly bodies. It has been calculated that a shock which should suddenly stay our earth in its course would produce as much heat as the combustion of fourteen earths of pure coal, and that in this heat the mass of the earth would be completely fused, and at least the greatest part of it would evaporate.

Helmholtz observes that in these assumptions nothing is hypothetical but the presupposition that the masses of our system were in the beginning distributed in space as vapour. This is so far right, that from such a distribution, in co-operation with gravitation, the total sum of heat and mechanical motion may be approximately reckoned. But

[42] Helmholtz, On the Interaction of Natural Forces, Königsberg, 1854, S. 27; reprinted in his Popular Lectures, Braunschw. 1871, E.T. 1873, p. 174. The following remarks on the relation of heat and mechanical force in the universe are from the same lecture.

in order to produce our solar system as it actually is, we need further certain presuppositions as to the mode of distribution of the nebular masses in space. The rotation of the whole mass, once given, must of necessity become ever greater with the increasing contraction and condensation; its original existence may be deduced in many ways, but also belongs to the more special assumptions in which considerable play is still left to hypothesis. It is most simply explained by not making the nebular masses concentrate immediately and equably into a single great ball, but by making several such masses collect around their own centres of gravity and then fall together with a non-central impact. We will here, in passing, with reference to Ueberweg's theory, to be mentioned later, interject that the whole process can be built also upon the collision of solid bodies, which, in consequence of the collision, first dissolve into a mass of vapour, and then, in the course of immeasurable time, are again organised into a new system.

The condensation hypothesis has gained an important support of late through spectrum analysis, which shows us that we find the same materials of which our earth consists in the whole solar system, and partly also in the stellar world. To the same method of inquiry we are indebted for the view that the nebulæ which appear scattered through the heavens by no means all consist, as might have been supposed earlier, of distant clusters of stars, but that a considerable number of them are really nebular masses, which may therefore present to us a picture of the earlier condition of our solar system.

In view of these confirmations, it is, on the other hand, of slight importance that recent geology has given up the revolutionary theory, and, so far as is at all possible, explains the formation of the surface of our planet from the same forces which we now see everywhere at work. The stability theory, which is supported on this geological tendency, can at most claim importance in a relative sense. We can regard the condition of the earth's crust

and the progress of the changes taking place in it as *comparatively* stable, as opposed to the theory of catastrophes, with which is frequently enough combined the shrinking from large figures referred to in the previous chapter. If, on the contrary, we assume sufficiently long periods, then a change, a becoming and perishing, is not only probable in itself, but it may be demonstrated on the strongest scientific grounds.

We may therefore well ask how it comes that we do not willingly deal with long periods of time; that, on the contrary, the idea of absolute stability lies comparatively so close to us; that in particular it has so little that is strange to our feelings? We descry the reason of this curious phenomenon only in the dulling habituation to the notion of eternity. This notion is familar to us from childhood, and, as a rule, we do not examine it carefully. Such, indeed, is the constitution of our mind, which is so closely connected with sensibility, that it seems necessary to lessen, as it were, absolute eternity in our conception, and to make it relative, in order in some degree to realise its meaning; much as we try to make the tangent of 90° in some degree picturable by making it *become—i.e.*, by making before the eye of fancy a very great and ever greater tangent—although for the absolute there can no longer be any becoming. Thus the popular images of the theologians deal with eternity, which heap one period of time upon another in thought, and then make the very utmost that the imagination can reach, as it were, 'a second of eternity.' Although the notion of an absolute eternity includes so much, that all that the soaring imagination can possibly think compared with it is no more than the most trivial space of time, yet this notion is so familiar to us that the man who speaks of an eternal existence of the earth and of mankind seems comparatively modest beside the man who would merely multiply, say, the period of transition from the diluvial man to the man of to-day a millionfold, in order to go back to the origin

of man from the simplest organic cell. Here sensibility is everywhere opposed to logic. What we can only in some degree picture to ourselves easily appears to us exaggerated and improbable, while we play with the most enormous conceptions when we have once brought them into the shape of an entirely abstract notion. Six thousand years on the one hand, eternity on the other—to this we are accustomed. What lies between them seems first remarkable, then bold, then magnificent, then fantastical; and yet all such predicates belong only to the sphere of feeling—cold logic has nothing to do with them.

It was formerly supposed, on a calculation of Laplace, that the period of the earth's revolution, from the days of Hipparchos to the present, had not altered by the three-hundredth part of a second; and Czolbe has employed this calculation to support his stability theory. But it is quite clear that nothing more could follow from such a fact than that the retarding of the speed of revolution, which must be assumed as necessary from the physical theory, never goes more quickly than about ·1 second in 600,000 years. But let us suppose that it reached a single second only in 100,000,000 years; still, after a few billions of years, the relations of day and night upon the earth must have been so totally changed that all the existing life of the surface must disappear, and the entire cessation of the axial revolution could not be far distant. We have, however, a thoroughgoing physical principle of this retardation in the effect of ebb and flood tides. Here all the conclusive keenness of mathematical conclusions finds its application. Only on the supposition of an absolute rigidity of the earth must the effects of the attraction which hinder the rotation completely cancel those which accelerate it. Since now there are some portions which may be delayed, the earth must of necessity receive an ellipsoid swelling, the delaying of which produces on the surface a friction, however slight it may be. The force of this inference cannot be in the least shaken by the fact

that, according to recent observations, the phenomena of ebb and flood which we perceive on our coasts are not so much produced by a progressive swelling, but rather by one considerable elevation, which takes place when the middle of the largest expanses of sea is exactly opposite the moon or sun. Though the circular waves propagated from this elevation, as they proceed equally in every direction, have no retarding influence on the speed of rotation, yet the retarding influence of the flood must be equally present, though less perceptible. The process cannot possibly be the same as if the earth were to turn backwards, and in the position in which the flood-wave is formed were each time to remain motionless for some seconds. There must be a progressive flood-wave, unless all physics are deceptive. The actual flood-tide we may regard as composed of the effects of a standing and a progressive flood-wave. Even if the effect of the latter may apparently disappear in the infinitely complicated phenomena of ebb and flood, yet its retarding effect can never be lost. And however small a constantly acting cause may be, we have only to take sufficiently long periods of time and the result is inevitable. A portion of the living force of the planetary movement is absolutely destroyed by ebb and flood. "We come thereby," says Helmholtz, "to the unavoidable conclusion that every tide, although with infinite slowness, still with certainty, diminishes the store of mechanical force in the system; and as a consequence of this, the rotation of the planets in question round their axes must become more slow, and they must approach nearer to the sun or their satellites to them."

There is but one means of avoiding the conclusion that at last the revolution of the earth must cease, namely, if we can discover an opposite effect, which again accelerates the speed retarded by ebb and flood. Such an effect Mayer, the well-known discoverer of the equivalent of heat, formerly believed he had found, by supposing that the cooling of the earth is not yet finished. The earth—

and with this he connected an explanation of earthquakes —is still constantly contracting, and therefore lessening its circumference, and with this must necessarily be involved an acceleration of the axial revolution. Mayer saw, however, very well that even in this assumption there lies no guarantee of eternal stability, since the two opposing influences cannot possibly maintain constantly an even pace. He assumed, therefore, three periods: one in which the acceleration in consequence of the contraction prevails; a second in which acceleration and retardation balance each other; and a third in which the retardation by ebb and flood prevails. Mayer believed at first that we are in the middle period, that of equilibrium; but he has abandoned this view. "It is ten years since the English astronomer Adams, in London, led by the discovery of the retarding influence of ebb and flood, proved that Laplace's calculation as to the constant duration of the sidereal day is not absolutely exact, since the speed of the earth's rotation is lessened, and the sidereal day, therefore, is already augmenting. This makes, indeed, in the course of thousands of years, only a small fraction of a second, for a whole thousand years namely only $\frac{1}{100}$ second! So that we must marvel at the human sagacity which has succeeded in ascertaining such an infinitesimal quantity." [43]

An equally indispensable condition of an eternally unchanging planetary motion, as the absolute rigidity of the heavenly bodies, is the absolute emptiness of the space in which they move, or at least the entire absence of resistance in the æther, with which we suppose space to be filled. It appears that this condition too is not ful-

[43] Naturwissenschaftl. Vorträge, Stuttg. 1871, S. 28. The passage belongs to a lecture 'On Earthquakes,' delivered in June 1870. We need not discuss the improbability of the theory on earthquakes there set forth. Some further details on Adams's calculation are in Zöllner, D. Natur d. Kometen, S. 469 ff. Zöllner shows, l. c. 472 ff., that Kant, as early as 1754, had demonstrated that ebb and flood must retard the rotation of the earth.

filled. Enke's comet describes, as it were, before our eyes an ever closer ellipse about the sun, and the most obvious way of explaining this is to suppose a resisting medium. Here indeed there is not the compulsion of a necessary deduction; but we have an observation which compels us to assume, as at least probable, the existence of a resisting medium. But with the mere fact of a resistance, however slight, of the æther nothing more need be said." [44]

Absolutely convincing, again, is the conclusion that the heat of the sun cannot last for ever. It is impossible to avoid this conclusion by denying the fiery condition of the sun and supposing a source of heat in an eternal friction between the body of the sun and its covering, or the æther, or anything of the kind. Notions of this kind have, in fact, for the most part, been rendered impossible by the recent keenly prosecuted studies of the sun. More rational is the hypothesis of the conservation of the sun's heat by the continual falling in of meteorites and smaller bodies; but even this theory leads to no stability. And this is still less so with the view of Helmholtz, which we may well regard as the truest, viz., that the main source of the conservation of the sun's heat is to be sought in gravitation.[45] The sun contracts, lessens its circumference,

[44] The explanation here assumed for the changes in the orbit of Enke's comet has, however, recently become very doubtful, as we have on the most exact examination not found a similar change in several other comets. On the other hand, it has been shown by Zöllner that all space must be filled with traces of atmospheric gases of the various heavenly bodies, as without such an assumption atmosphere could not exist in equilibrium in empty space. Should then the æther too be given up, as many scientific men seem inclined to do, yet the existence of very thin masses of gas must be assumed, which must produce an effect, however small, in the sense indicated.

[45] "If, however, we adopt the very probable view that the remarkably small density of so large a body is caused by its high temperature, and may become greater in time, it may be calculated that if the diameter of the sun were diminished only the ten-thousandth part of its present length, by this act a sufficient quantity of heat would be generated to cover the total emission for 2100 years. So small a change it would be difficult to detect even by the finest astronomical observations." Helmholtz, Pop. Lect., E.T. 190. On the 'Meteor Theory,' first proposed by Mayer and afterward by some English physicists, see Tyndall, Heat Considered as a Mode of Motion, 1863.

and thus mechanical force is converted into heat. That this process must, however, ultimately cease is matter of course. No motion can be conceived by which heat is produced without the consumption of other forces. We may suppose, therefore, any theory we choose as to the sun's heat: it will always come to this, that the source of this heat is finite, while its consumption is infinite. We must always come to the conclusion that in the course of infinite time the to us so interminable duration of the sun's heat and light will not only fall off, but will completely disappear.

Finally, there seems to result also, as a simple consequence of the mechanical theory of heat, the destruction of all life in the whole universe. As regards the earth, this destruction of course is involved in that caused by the extinction of the sun. Mechanical force can always be converted into heat, but heat can only be converted into work when it flows from a warmer to a colder body. With the equalisation of temperature in any system whatever ends the possibility of further changes, and accordingly of any kind of life. The sum of possible changes, or the 'Entropy,' as Clausius calls it, has reached its maximum.[46] Whether, however, this conclusion, though it rests upon conclusive mathematical reasoning, can actually be applied to the universe in the strictest sense of the term, depends essentially upon the ideas which we form of its infinity; and here we again find ourselves in a transcendental sphere. There is nothing, that is to say, to prevent us from multiplying such frozen systems at pleasure, and supposing them to attract each other from infinite distances, and then producing afresh from their collision the play of cosmogony as it were upon a larger

[46] Clausius, Abh. über d. mechan. Wärmetheorie, ii. 44, proposes the two following principles: (1) The energy of the world is constant; (2) The entropy of the world tends to a maximum. On the notion of 'Entropy,' comp. *l. c.* S. 34 f. The whole deduction, however, presupposes the finiteness of the material world in infinite space. Helmholtz treats this inference popularly in his 'Vortr. über die Wechselw. der Naturkr.,' S. 24 f.

scale. Nothing prevents us from making such an assumption except the question whether we are entitled, merely because we cannot conceive any limit to creation, to suppose a material infinity of worlds as actually existing.

Materialism taught even in ancient days the origin and destruction of our universe, while by the doctrine of the infinity of worlds it secured that satisfaction of the mind which lies in the simple belief in the permanence of things. Amongst our modern Materialists Czolbe especially has not been content with this, and postulates an eternal persistence of terrestrial life from the standpoint of our spiritual needs. Feuerbach's categorical imperative, 'Content thyself with the given world!' seems to Czolbe impracticable until at least the persistence of this 'given world' is secured against the destruction threatened by the conclusions of the mathematicians. But it is very doubtful whether, from the standpoint of our peace of mind, it seems better completely to carry out one's system while its very foundation remains exposed to the most violent concussions, or once for all to acquiesce in a limit to knowledge and opinion beyond which all questions are left open. In fact, in view of the convincing proofs which we have adduced, it must be seen that Czolbe's satisfaction-theory is built upon sand, and therefore, in the long-run, can no more attain its end than the popular dogmatism which, on the contrary, will not give up a beginning and an end of things—the Creation and the Day of Judgment. If we once rise above this standpoint—if we seek the peace of the soul in what is given, we shall easily learn to find it not in the eternal duration of material conditions, but in the eternity of natural laws, and in such a duration of existing things as removes the idea of their destruction to a proper distance from us. The architectonic inclination of the reason will content itself, if we reveal to it the charm of a view of things which has no sensible support, but which also needs none, because the absolute is wholly set aside. It will

remember that this whole world of relations is conditioned by the nature of our knowing faculty. And even though we always come back to this, that our knowledge does not disclose to us things in themselves, but only their relation to our senses, yet this relation is always more perfect, the freer it is; nay, it is, in fact, the more intimately related to the justified imagination of the absolute, the more free it holds itself of arbitary admixtures.

Almost more even than the origin of the universe has the origin of organisms for a considerable time occupied the thoughtful mind. This question is of importance for the history of Materialism, if only because it forms the transition to those anthropological questions about which the Materialistic controversy has been wont to turn. The Materialist demands an explicable world: it is enough for him if the phenomena can be so conceived that the compound proceeds from the simple, the great from the small, manifold motion from simple mechanics. The rest affords him no anxiety, or rather he overlooks the difficulties which only come to view when the explicable world has been so far established in theory that the law of causality has no further sacrifice to demand. Even in this sphere Materialism has drawn nourishment from things which must be recognised from any rational standpoint; yet, until quite recent times, the origin of organisms was a point of which the opponents of Materialism made emphatic use. In particular, it was believed that the origin of organisms necessarily led us to a transcendental creative act, while in the arrangement and preservation of the organic world fresh supports for teleology were supposed to be constantly found. In fact, a certain opposition to Materialistic views was frequently connected with the very terms 'organic,' 'living,' inasmuch as here was found, as it were, the embodied antithesis of a higher, spiritually working force, as opposed to the mechanism of dead nature.

In mediæval, and still more at the outset of modern

times, especially so far as the influence of men like Paracelsus and Van Helmont extended, no such chasm was found between the organic and inorganic worlds as in the last centuries. It was a widespread notion that all nature was animated. If even Aristotle made frogs and snakes originate from mud, such ideas were only too natural under the dominion of alchemy. Those who descried spirits even in metals, and a process of fermentation in their combination, could hardly find any special difficulty in the origin of life. There was, indeed, in general a belief in the invariability of species—a dogma which comes direct from Noah's ark—but it was, at the same time, not taken too literally, and especially the lower creatures were made to the fullest extent to develop from inorganic matter. Both articles of faith have lasted till to-day — the one more amongst professors, the other amongst peasants and carters. The former believe in the invariability of species, and search twenty years perhaps in the bite of snails for proof of their belief; the latter are continually finding confirmation in their experience that fleas originate from sawdust and other materials. Science has only succeeded here later than elsewhere in bringing articles of faith down to hypotheses, and in stemming the broad current of opinions by experiment and observation.

The very question which first confronts us is even yet the object of a bitter controversy—the question of spontaneous generation (*generatio aequivoca*). Carl Vogt has given us a humorous account of how in Paris the scientific battle between Pasteur and his allied opponents, Pouchet, Joly, and Musset, is carried on with the bitterness of theologians, and with a dramatic effect which reminds us of the magistral theses of the fifteenth century. On Pasteur's side are the Academy and the Ultramontanes. To controvert the possibility of spontaneous generation is a mark of conservatism. The old authorities of science were unanimous that no organic being can ever be pro-

duced without egg or seed. *Omne vivum ex ovo* is a scientific article of faith. But why do the orthodox take this side? Perhaps only to establish a something inexplicable, to spite the reason and the senses by holding fast to a purely mystical creation. The older orthodoxy, in the lead of S. Augustine, took quite another standpoint—to some extent a half-way one. There was no disdain of the notion of making things as intelligible as possible. Augustine taught that from the beginning of the world there had existed two kinds of seeds of living things: visible ones, which the Creator had placed in animals and plants, that each might bring forth after its kind; and invisible ones, which are concealed in all elements, and become active only under certain conditions of combination and temperature. It is these invisible seeds, latent in the elements from the first, which produce plants and animals in great numbers, without any co-operation of existing organisms.

This standpoint would be quite favourable to orthodoxy; it might even, without much trouble, be so far modified that, in the present state of the sciences, it might be maintained just as well as either of the two conflicting dogmas. But as in the heat of a contest the champion is often half compelled, half involuntarily changes his position, so too it happens in the whole course of scientific controversies. The Materialism of the last century here plays its part. In endeavouring to explain life from the inanimate, the soul from matter, the supposed origin of insects from decaying matter was ranged together with the resuscitation of dead flies by salt, with the voluntary movements of beheaded birds and other instances, for the Materialistic view. Friends of teleology and natural theology, supporters of the dualism of mind and nature, adopted as their tactics to controvert utterly the origination of insects and infusoria without generation; and the conflict of ideas led, as so often in the history of science, to fruitful and ingenious experiments, in which the Materialists were behindhand. After the much-read

and admired Bonnet, in his 'Contemplations de la Nature,' had refuted *generatio aequivoca*, it was counted as spiritualism to maintain the *omne vivum ex ovo*, and in this point orthodoxy harmonised literally with the results of exact research. Indeed, it seemed almost to our own times as though that principle would be the more inexpugnably established the more exactly and carefully investigation went to work.

Metaphysic went mad over the new discovery. It was concluded that in natural propagation all future generations must be already contained in the egg or spermatozoon; and Professor Meier of Halle exhibited this 'preformation theory' so naïvely and vividly, that it would be unfair to our readers not to give them a sample. "Thus," says the Professor, "Adam must have carried all men in his loins; for instance, the very spermatozoon from which Abraham was. And in this spermatozoon all the Jews lay as spermatozoa. When, then, Abraham begat Isaac, Isaac went out from his father's body and took with him, as part of himself, the whole race of his descendants."[47] The remaining unused spermatozoa, which it was natural to regard as possessing some share of soul, gave rise, as we may understand, to much wilder fantasies, which do not concern us here.

In recent times it was Schwann in particular who partly demonstrated the true element of all organic formations in the cell, partly showed by a series of experiments that in the apparent origin of organisms by *generatio aequivoca* the presence of eggs or germ cells must always be presupposed. His methods of proof were generally regarded as excellent, but it was one of our own Materialists, Carl Vogt, who definitely expressed his doubts of their sufficiency, long before the old controversy burst again into such violent flame in France. We gather the tenour of his keen and thorough criticism from the *Bilder aus dem Thierleben*, 1852.

[47] Meier's Metaphysik, 3 Th. § d. Seelen d. Menschen u. Thiere: 785; cit. in Hennings, Gesch. von Halle, 1774, S. 504 n.

The infusoria originate from the combination of air, water, and organic matter. Schwann found means to destroy all organic germs in these constituents. If now they are isolated and yet infusoria originate, then *generatio aequivoca* is proved. Hay was boiled with water in a retort until not only all the fluid, but even the air in the neck of the retort, was heated to the boiling-point. It was known that in closed retorts no infusoria would originate. If now ordinary air was admitted to the retort, then infusoria always appeared despite the previous boiling; if, on the contrary, only air was admitted which had been passed through a red-hot tube, through sulphuric acid, or through caustic potash, no infusoria ever appeared. Now it is supposed that the composition of the air is not altered by the means employed. This is, however, only approximately true. The atmosphere contains not only oxygen and nitrogen. "It contains a certain quantity of carbonic acid, of aqueous vapour, of ammonia, perhaps infinitesimal quantities of many other matters. These are by the means adopted more or less decomposed and absorbed, the carbonic acid by the potash, the ammonia by the sulphuric acid. The heating of the air must produce a partial influence upon the arrangement of its molecules. . . . We have cases enough in chemistry where apparently very inconsiderable circumstances are needed to produce a combination or decomposition. . . . It is possible that just the precise quantity of ammonia, of carbonic acid, that a certain disposition or tension of the atmospheric molecules is necessary in order to set up and complete the process of the fresh formation of an organism. The conditions in which the two retorts are placed are therefore not perfectly alike, and therefore also the experiment does not appear quite conclusive." In fact, this argumentation shows the inadequacy of Schwann's experiment, and the question may therefore be treated as an open one, especially as a series of weighty considerations is opposed to the assumption that all the germs of the countless infusoria which

appear in these experiments circulate in the air in a condition capable of life. Ehrenberg supposed a division of the infusoria, which proceeding in geometrical ratio would in a few hours people the water; Vogt, on the contrary, has shown the improbability of this hypothesis.[48] Recently the practice has arisen of systematically collecting the dust particles which may be floating in the air before the experiment is begun. Pasteur throws his collection of supposed germs and eggs into the fluids intended to be experimented with, and believes that he thus sows infusoria and funguses; Pouchet previously examines the collection. "He lets hundreds of cubic metres of air stream through water, and examines the water; he invents an instrument which blows the air against glass plates, to which the seminal dust remains attached; he analyses dust which has been deposited, and he makes these experiments on the glaciers of Maladetta in the Pyrenees, as well as in the Catacombs of Thebes, on the continent as well as on the sea, on the Pyramids of Egypt as well as at the summit of Rouen Cathedral. Thus he brings together a mass of air-inventories, in which, indeed, everything conceivable figures, but only very seldom a germ-spore of a fungus plant, and much seldomer still the dead body of an infusorium."

For all this, the state of things remained that spontaneous generation had not been demonstrated despite the pains spent upon it. Schwann's experiments were varied and modified in the most manifold ways, but as often as spontaneous generation seemed to be reached, more exact experiments showed that the possibility of a communication of germs was not excluded. The greatest impression was produced in the last few years by the experiments of Bastian and of Huizinga. The latter in particular were very seductive, since in a hermetically fused glass retort, after ten minutes' boiling of the liquid, there appeared Bacteria, and only Bacteria; so that it seemed safe to assume spon-

[48] According to recent researches, such a mode of propagation must be assumed for certain organisms of the lowest kind—*e.g.*, for Bacteria.

taneous generation at least for these simplest of organisms. But in Pflüger's laboratory the same liquid, fastened up in the same way, was kept boiling for hours, and even after it had cooled no Bacteria were produced. There remained, therefore, the possibility that there were germs in the liquid which were not destroyed by ten minutes' boiling, though they could not resist a longer application of heat.[49]

At the same time it must be admitted that continuous boiling might possibly destroy other and as yet unknown conditions of Bacterial existence. So that the proof is by no means convincing that there were actually germs present in the liquid which were in the first case developed, and in the second destroyed. The result, therefore, of all these experiments remains, that spontaneous generation is not established, and just as little shown to be impossible.

A fresh possibility for the origin of organisms seemed to be opened by the discovery of Monera, those formless, and, so far as our means of examination reach, structureless lumps of protoplasm, which maintain, nourish, and propagate themselves without possessing any distinct organs. Haeckel, who regards spontaneous generation as an indispensable, if as yet unconfirmed hypothesis, promises himself much in this regard from a slime-creature living in the still depths of the sea of the following kind:—"Even among the Monera at present known there is a species which probably even now always comes into existence by spontaneous generation. This is the wonderful *Bathybius Haeckelii*, discovered and described by Huxley." This Moneron is found "in the greatest depths of the sea, at a depth of between 12,000 and 24,000 feet, where it covers the ground partly as retiform threads and

[49] A review of these experiments, according to Pflüger's Archiv für d. ges. Physiol., vii. S. 549, viii. 227, appears in Dr. Sklarek's Naturforscher, vi. Jahrg. (1873), Nos. 33 and 49. On the refutation of Bastian's experiments, see *inter alia* Naturf. vi. No. 26 (S. 209 f.) and No. 48 (S. 453 f.).

plaits of plasma, partly in the form of larger or smaller irregular lumps of the same material." [50]

"If we do not accept the hypothesis of spontaneous generation," he says further on, "then at this one point of the history of development we must have recourse to the miracle of a *supernatural creation*. The Creator must have created the first organism, or a few first organisms, from which all others are derived, and as such He must have created the simplest Monera or primitive Cytods, and given them the capability of developing further in a mechanical way." Haeckel rightly finds the latter idea "just as unsatisfactory to a believing mind as to a scientific intellect." We may, however, go further, and assert that such an alternative is logically quite inadmissible. To scientific research the intelligibleness of this world must be an axiom; and if, therefore, we hold spontaneous generation to be improbable, the origin of organisms remains simply as a yet unsolved problem. Natural science has not the slightest occasion now or ever to suppose a "supernatural" act of creation. To fall a victim to such explanations is accordingly always an abandonment of scientific ground, which in a scientific inquiry can never be mentioned as admissible, or even as matter for consi-

[50] Haeckel, Natürl. Schöpfungsg., 4 Aufl., Berl. 1873, S. 306, 309 ff., E. T. i. 344. Comp. the same writer's 'Beiträge z. Plastidentheorie' in the Jenaische Zeitschr., Bd. v. Hft. 4. In this essay, which has for its subject the modification of the cell-theory necessitated by recent discoveries, and the consequences of the new conception, is the following passage (S. 500):—"The most important fact which results from Huxley's very careful investigation of Bathybius is that the bottom of the ocean in its greater depths (beyond 5000 feet) is covered with enormous masses of fine living protoplasm, and this protoplasm persists there in the simplest and most primitive shape—*i.e.*, it has as yet no definite form at all, and is hardly yet individualised. We cannot ponder this highly remarkable fact without the deepest astonishment, and cannot help thinking of Oken's 'primitive slime.' This universal slime of the older philosophy of nature, which was supposed to have originated in the sea, and to be the primitive source of all life, the productive material of all organisms,—this famous and notorious primitive slime, whose all-embracing importance was indeed already implicitly established by Max Schultze's protoplasm theory, seems by Huxley's discovery of Bathybius to have become completely true."

deration. To those, however, who regard a creative act as a spiritual necessity, it must be left to consider whether they prefer to take refuge with it in that dark corner which the light of science has not yet reached, or whether they rather declare against all science, and, untouched by the rules of the understanding, believe what seems good to them; or whether, lastly, they know how to take up their stand on the ground of the ideal, and revere what science calls a natural event as an outcome of Divine power and wisdom. That only the last standpoint is suited to an advanced state of culture, while the first is indeed the commonest, but also in every way the weakest, we need here only indicate.

Finally, it by no means follows that to give up terrestrial spontaneous generation involves the giving up of any possibility of asserting a consistent causal connexion in nature.

Here we have first to consider a recently proposed hypothesis of the English physicist Thomson,[51] which derives the origin of the organisms upon our earth from space, and makes use of meteorites to carry them. "When a volcanic island springs up from the sea, and after a few years is found clothed with vegetation, we do not hesitate to assume that seed has been wafted to it through the air or floated to it on rafts. Is it not possible, and, if possible, is it not probable, that the beginning of vegetable life on the earth is to be similarly explained?"

Thomson regards the meteorites as fragments of ruined worlds which were once covered with life. Such ruins may in a collision partly remain tolerably uninjured, though a great portion of them is melted. If, then, we suppose "that there are at present, and have been from time immemorial, many worlds of life beside our own, we must regard it as probable in the highest degree that

[51] Thomson has developed this hypothesis in a very pregnant address at the opening of the British Association in 1871 on the latest discoveries in natural science. The passages here in question are also printed in Zöllner, Die Natur d. Komet., S. xxiv. f.

there are countless seed-bearing meteoric stones moving about through space. If at the present instant no life existed upon this earth, one such stone falling upon it might, by what we blindly call natural causes, lead to its becoming covered with vegetation."

Zöllner tries to show that this hypothesis is unscientific; first of all formally, because it only postpones the problem, and so makes it more complicated. We must then ask, Why was this ruined world covered with vegetation and our own not? But he would also call it materially unscientific to make meteorites the bearers of the seed, because the friction with our atmosphere must make them red-hot.

Helmholtz, who defends Thomson's hypothesis against the reproach of being unscientific, reminds us that the large meteorites are heated only externally and remain cold internally, where such seeds might very well be sheltered in crevices. And even the seeds situated at the outside, upon entering the outer strata of the atmosphere, would be blown inwards before the heat could reach a destructive degree. Helmholtz, who had even before Thomson mentioned, in a scientific lecture, the same hypothesis as admissible, is ready to leave it to every one whether to regard it as so extremely improbable. "But," he remarks, "it seems to me a thoroughly correct scientific procedure, when all efforts to produce organisms from lifeless matter have failed, to ask whether life ever has originated, whether it is not as old as matter, and whether its germs may not have been carried about from one world to another, and have been developed wherever they found a favourable soil." [52]

It is, in fact, very easy to answer to Zöllner's "formal" objection, that we must suppose our earth to have been originally devoid of vegetation simply because it had to pass from a fiery-fluid condition into a condition capable

[52] Comp. Zöllner, D. Natur. d. Komet., Vorr. S. xxv. f., and Helmholtz's reply in the preface to the second part of the first volume of the translation of Thomson and Tait's 'Handbook of Theoretical Physics,' S. xi. ff.

of vegetation. If we suppose that the other world has gone through just the same process, only at an earlier period, it must of course have derived its life from a third world, and so on. This indeed is to push the question further back, but by no means makes it more complicated. In any case, that great shoal is avoided which the explanation of organisms finds in Kant's hypothesis of condensation. We find ourselves in a process *ad infinitum*, and this kind of 'postponement' has at least the advantage that it brings the unsolved difficulty into good company. The origin of life thus becomes as explicable and as inexplicable as the origin of the world generally; it comes into the sphere of transcendental problems, and to transfer it into this sphere is by no means logically improper, as soon as natural science has good grounds within its sphere of knowledge to regard such a theory of transmission as relatively the most probable.

Zöllner agrees with Haeckel that *generatio aequivoca* can only be denied on *a priori* grounds by doing violence to the law of cause. Instead, however, of admitting at the same time the possibility of a supernatural creative act, he regards the question, deductively considered, as decided, and even regards it as a lack of philosophical culture that the men of science still attach so much value to the inductive proof of *generatio aequivoca*. With formal correctness he observes, that by no perfection of experiment could we escape the germ-theory, since we could not prevent any one from maintaining that "the primitive organic germs belonged in point of size to the order of æther-atoms, and forced their way with the latter through the intervals between the material molecules which form the boundaries of our apparatus." At the same time this remark can at most only be sometimes applied satirically to the certainty with which Pasteur and similar dogmatists hold that their experiments have definitely refuted *generatio aequivoca*. No one will seriously propose such an hypothesis, as long as we see that in certain cases a fluid

sealed up for a very long period remains without any trace of life.

Inductive inquiry, therefore, is here by no means so indefensible, as long as it reaches various results by various methods and can compare these. Even the principle laid down by Zöllner of acquiescence in the axiom of the intelligibility of the world is by no means free from serious doubts. If Zöllner is more right than Haeckel in regarding the supposition of an *unintelligible* origin as not worth mentioning, Haeckel is right on the other hand when he tries to form to himself, even on the basis of a bold hypothesis, a picturable conception of the way in which the thing may have happened. Helmholtz quite correctly points out that Zöllner is here in the path of metaphysic—so dangerous to the man of science—and he shows that the correct alternative must be: "Organic life has either begun to be at some particular time or it exists from eternity."

Leaving aside the critical objections to the notion of an absolute eternity, the question is correctly stated; but even then it will still ever remain a desirable maxim of research not to relax the effort to demonstrate the terrestrial origin of organisms, in order that the more convenient removal of the problem into the universe may not hinder the progress of empirical knowledge by a metaphysical construction.

Let us finally mention again here the view of Fechner, who, in a treatise rich in thought but also in hypothesis, attempts to carry out the view that the organic molecules are *older* than the inorganic molecules, and that on the "principle of increasing stability" the latter might well be developed from the former, but not conversely. This whole assumption rests, however, upon a presupposition as to the mobility of the atoms in the molecules which still greatly needs confirmation, if it is indeed capable of confirmation.[53]

[53] Fechner, Einige Ideen zur Schöpfungs- u. Entwicklungsgeschichte der Organismen, Leipz. 1873. In this valuable book—especially as regards the questions raised by Darwin—Fechner proposes the hypothesis,

In all this sphere scientific research can on the whole pursue but one single course, and if this be called Materialistic, we must not forget the limits of the Materialistic view of things demonstrated in the previous chapters. Here it is only a single point which reminds us of these limits and of the critical standpoint of the theory of knowledge—the notion of infinity in its application not only to the co-existent worlds and world-materials, but also to the course of time in the problem of beginning or no beginning, and how the one hypothesis or the other is to be represented in thought. We do not intend, however, to go here into the subjective origin of these notions, and to show how they can only find an adequate explanation in a 'world as representation.' We shall find better opportunities to oppose the Idealistic to the Materialistic standpoint; it is enough to establish that genuine Idealism in the whole sphere of the explanation of nature, so far as the relations between phenomena are concerned, goes at least as entirely hand in hand with natural science as Materialism by any possibility ever can.

that the particles in organic and inorganic molecules are in a different state of mobility. In the latter the particles vibrate about fixed positions of equilibrium without the displacement of a point *b*, with regard to a point *a*, ever reaching more than 180° (measured on the motion of the radius vector to *b* from *a* as centre). There then occurs no change in the initial sign of their relative position. On the other hand, Fechner supposes that the particles of organic molecules move with regard to each other in such a way that the initial sign of the relative position constantly changes, "as may happen through circular and other complicated movements of the particles with regard to each other." This state of motion is supposed to be kept up, however, by the "inner" forces of the molecule. Fechner then supposes further, that this state of matter is the original one; the inorganic state, on the contrary, a later arising one. Organic and inorganic molecules can enter into the closest union with each other, and this mixture brings it about that the distinction between organic and inorganic states is a relative one, and an absolutely fast limit between the two cannot be assigned.

CHAPTER IV.

DARWINISM AND TELEOLOGY.

When the first edition of the 'History of Materialism' appeared, Darwinism was still new; the parties were just taking up their positions, or, more strictly, the rapidly growing party of 'German Darwinians' was still in process of forming, and the reaction, which at present sees here the most threatened point in the old theory of things, was not yet properly in harness, because it had not yet properly appreciated the range of the great problem and the inward power of the new doctrine.

Since then, the interest of friends and foes has been so much concentrated on this point, that not only an extensive literature has sprung up on Darwin and Darwinism, but that we may say that the Darwinian controversy is to-day what the general Materialistic controversy was formerly. Büchner is still ever finding new readers for 'Kraft und Stoff,' but we no longer hear a literary outcry of indignation when a new edition appears. Moleschott, the true author of the Materialistic movement, is almost forgotten by the great public, and even Karl Vogt is now seldom mentioned except in reference to some special question in anthropology or some isolated and immortal utterance of his drastic humour. Instead of this, every periodical takes sides for or against Darwin; there appear almost daily larger or smaller treatises on the theory of descent, natural selection, and especially, as we may expect, on the descent of man, since there are many members of this particular species who lose their wits, if

any doubt is raised of the genuineness of their ancestral tree.

Despite this great movement, we may still maintain unchanged nearly everything that we wrote on Darwinism eight years ago, though we can no longer leave the matter where it was then. The material has grown, even if the *scientific* material has not grown quite in proportion to the printed paper: the questions have been specialised. Formerly Darwin was the only influential champion, not only of the theory of descent, but we may almost say of the natural explanation of organic forms in general. At present it happens that bitter attacks are directed against Darwin and Darwinism by people who confine themselves to the theory of natural selection, as though everything else would have existed even without Darwin. The manifold adumbrations of views, which then existed only in germ, have now become definite and prominent, and have brought with them new supports and new doubts. What we then said on the subject, therefore, can only now serve, as it were, as a general introduction to a more thorough discussion; but as many of our previous utterances have been made the subjects of approving or dissenting comments, we print them here quite unchanged, and make the necessary modifications in the notes and in the subsequent additions. There is in the whole of modern science, perhaps, no such instance of so empty and at the same time so crass a superstition as that of Species, and there are probably few points in which men have gone on rocking themselves with such baseless argumentations into dogmatic slumber.[54] It almost passes understanding how a scientific inquirer who has specially interested himself for

[54] The absolute idea of species here attacked has its double root in the metaphysical import of the Platonico-Aristotelian *εἶδος* and in the traditions of Noah's Ark. The classification of organic forms according to species may, it is obvious, not only serve the practical purpose of mastering detail, but may even assume a certain material importance, without any dogma as to the invariableness and transcendental basis of kinds. From Darwinism itself, by the help of the principle of increasing stability,

twenty years in the establishing of the notion of species, who undertakes to set up in the capacity of propagation a new criterion of species, during all this time institutes no single experiment on the matter, but confines himself as a genuine natural historian to sifting critically the casual traditional narratives. It is true that even in the sphere of scientific inquiry the division of labour between experiments and the critical comparison of experiments is perfectly safe, and that to a wider extent than is usually recognised. But when a field is still so completely unbroken as that of the formation of species, it is assuredly the first critical utterance to which sound reason and scientific method must lead, that in this sphere, as in every other, only experiment can teach us anything. Yet Andreas Wagner erred so widely from the path of scientific research as to suppose himself to be doing a great service when he demands a juristic proof for the supposed bastard forms, and regards his dogmas as established until this is produced.[55] This may indeed be the most suitable course if we regard a darling prejudice as a personal possession, and answer him who would rob us of it with a title by prescription; but this whole standpoint has not the most distant similarity with scientific inquiry. A single trait may serve to characterise a method with the results of which it would be a frivolous waste of time to busy ourselves further.

We are acquainted with a series of obviously bastard

we may deduce that organisms within very long periods must adopt a tendency to group themselves into species and to define themselves from each other. But this is something quite different from the absolute idea of species which, during the reaction against the Materialism of Vogt and others, made its appearance in a shape which violated all the principles of natural science.

[55] Andreas Wagner, Naturwissenschaft u. Bibel, im Gegensatze zu dem Köhlerglauben des Herrn Carl Vogt, als des wiedererstandenen u. aus dem Französischen in's Deutsche übersetzten Bory. Stuttg. 1855. Cf. *e.g.*, S. 29. Such stories (of fertile hybrids) . . . "gründen sich auf Aussagen von Landwirthen und Reisenden, denen jedoch der stringente Nachweis, wie ihn der Untersuchungsrichter zur rigorösen Constatirung des Thatbestandes verlangt, abgeht." S. 31: "Entweder sind solche Angaben geradezu falsch, oder sie ermangeln der juridischen Beweiskraft," &c.

forms which have resulted from the trifling of fanciers or from chance, and which, more or less accredited, pass from mouth to mouth. From such materials, then, the question is decided what is the fertility of the bastards (*a*) with each other (*b*) with the parent race. We see at the first glance, if we sample the excellent material, that as to *a* there are no, or very few, examples, because there was only one bastard, which, therefore, could not be coupled with another of the same kind, or because the bastards of different sexes were separated and given away, as no one thought of experimenting on the production of new kinds. As to *b* there results the great truth that the bastard races gradually return again to the original races, because from generation to generation they have been paired with one of the same race. From this, then, the final conclusion is drawn that bastards are either infertile, or can only reproduce themselves by pairing with the parent races, since the opposite assertions "lack legal proof." The opponent must lose the case: the inventory of prejudices is saved.

Everybody knows how we ought to set to work here, if our object is not to save a prejudice but to find the truth, which can hardly be considered an unsuitable object for a man who busies himself for twenty years with the question of species. Obviously he should, with all the care exhibited by modern science in other departments, and to which it owes its great successes, first have produced a long series of hybrid forms, *e.g.*, between canaries and linnets. A long series is necessary, not only to eliminate accident and secure a true average, but it is demanded by the very nature of a problem which turns upon a question of more or less. Let us take an equal number of pairs of the same hybrids, and, moreover, of hybrids with the father's and the mother's race respectively. Let these pairs be brought into as nearly as possible the same circumstances of relative and absolute age, of nurture and environment, or let these circumstances be varied methodically, and we shall have a result on the

strength of which we may express certain probable conclusions; which would be of more value than Wagner's twenty years' testing of the legal value of gamekeepers' stories.

Darwin has taken a mighty stride towards the completion of a philosophical theory of the universe which can satisfy equally the understanding and the soul, since it bases itself upon the firm foundation of facts and portrays in magnificent outlines the unity of the world without any inconsistency with details. His account of the origin of species, however, as a scientific hypothesis demands the confirmation of experiment, and Darwin will have done great service if he succeeds in calling the spirit of methodical research into a sphere which promises the richest reward, while it demands also, it is true, the utmost sacrifice and perseverance. Many of the experiments thus required may surpass the powers or even the duration of the individual inquirer's activity, and only future generations will reap the fruits of the work which the present must begin. But in this very circumstance will be announced a fresh advance towards a noble conception of the task of science, and the right appreciation of this task must strengthen the feeling of the solidarity of mankind and the community of his daring aims.

What renders Darwin's theory capable of such an effect upon inquiry, is not only the clear simplicity and satisfactory rounding of the fundamental idea which lay ready in the experience and methodical needs of our days, and must easily have resulted from the casual combination of the various ideas of the age. An incomparably higher merit undoubtedly lies in the persevering prosecution of an object which as early as 1837 took firm hold of the naturalist on his return from a scientific voyage, and to which he dedicated his future life. The abundant material which Darwin has collected is for the most part still delayed; more exact proofs for his assertions are

still lacking, and a greater work still to come will, it may be hoped, exhibit in its full extent the gigantic labours of this distinguished man.[56] Many wish to postpone their judgment on Darwin's theory until this material has appeared, and this caution cannot be objected to, since criticism will have much to say even to this work of human industry and acuteness, until the permanent is separated from the temporary and subjective elements. But we must quite understand that a satisfactory verification of this great hypothesis by no means depends upon this material only, but that the independent activity of many, and, perhaps, the experimental labours of generations, are required in order to confirm the theory of *natural* selection by *artificial* selection, which may repeat in a comparatively short period the work for which nature requires thousands of years. On the other hand, Darwin's theory possesses even in its present form an importance stretching far beyond the reach of a casually suggested problem. His collection of observations exhibits not the least similarity to Wagner's clumsy protocols on the legitimacy of isolated hunters' tales. Darwin understands how, by the subtle and ingenious combination of verified observations, to bring the whole natural history of plants and animals into connexion with his theory. Every ray is gathered into one focus, and the rich development of theory guides the apparently most remote phenomena of organic life into the stream of proof. But if we would indicate the most admirable aspect of his work, we must point out that this very articulation of the fundamental idea, its support by numerous doctrines and auxiliary hypotheses, has scarcely ever anything arbitrary or forced about it; nay, that many of these are not only more self-evident than the main idea, but at least as high also, if not higher, in scientific importance. We are thinking

[56] Instead of a single great work, a series of special treatises has appeared, amongst which that on 'The Variation of Animals and Plants under Domestication,' 2 vols., 1868, is especially rich in material.

here in particular of the doctrine of the struggle of species for existence, and the far-reaching relations of this doctrine to teleology.

The theory of the origin of species carries us back to a primeval period, which bears a character of mystery from the fact that the fancies of mythology are here opposed only by a series of possibilities whose great number extraordinarily weakens the credibility of each single one. The struggle for existence, on the other hand, goes on before our eyes, and yet for centuries it escaped the observation of an age watching for the truth. A reviewer of Radenhausen's 'Isis,' a recent excellent, if not quite thoroughgoing, naturalistic system,[57] feels called upon to make a remark which shows us with what difficulty a totally unprejudiced observer surveys the position of these questions at a moment when any one who can appreciate it must come to a perfectly unequivocal result. Radenhausen employs Darwin's doctrine in order to draw conclusions which lead us back to the primitive radical opposition of Empedokles to teleology, though he admits that the perfect demonstration of Darwin's doctrine is yet to come. Two sentences from his reviewer in the 'Literarisches Centralblatt' may here serve us as the text of a discussion which would in any case be unavoidable, and for which we can only here find a suitable connexion. "People prefer," says the anonymous writer, "for an extramundane causality, operating designedly but mysteriously, to substitute the *possibility* of happy accidents, and find in the progressive development of what a happy accident has begun a compensation for the fact that all

[57] My judgment on Radenhausen's 'Isis' would, however, hardly be so favourable now, especially as to the historical and historico-psychological developments, which are often hazardous and inaccurate. This, however, little affects the argumentation in regard to teleology. Let me add, moreover, that the reviewer in the Liter. Centralblatt (1863, S. 486) writes of it:—"The book is throughout written with an impassive calm and self-confidence which remind us of Spinoza." The polemic mentioned in the text of what we may describe as the Empedoklean standpoint, is in the Lit. Centralb., 1864, S. 843 f.

phenomena are at bottom senseless and purposeless, and that the beautiful and the good lie not at the beginning, but only come to view at the end, or at least only in the course of events. . . . So long as these discoveries are not yet really made, we may be allowed to ask ourselves the question whether the hypotheses which this naturalism holds to be justified are less bold and hazardous than the presuppositions of the teleological view of the world."

The reviewer is a type; most of those who, in spite of modern science, feel themselves justified in holding fast to teleology, cling to the gaps in scientific knowledge, overlooking the fact that at all events the form of teleology which has existed until now, that is, the anthropomorphic, is utterly disposed of by the facts, and that whether the naturalistic view has been sufficiently established or not. All teleology has its root in the view that the builder of the universe acts in such a way that man must, on the analogy of human reason, call his action purposeful. This is essentially even Aristotle's view, and even the Pantheistic doctrine of an 'immanent' purpose holds to the idea of a purposefulness corresponding to human ideals, even though it gives up the extramundane person who in human fashion first conceives and then carries out this purpose. It can now, however, be no longer doubted that nature proceeds in a way which has no similarity with human purposefulness; nay, that her most essential means is such that, measured by the standard of human understanding, it can only be compared with the blindest chance. On this point we need wait for no future proof; the facts speak so plainly and in the most various provinces of nature so unanimously, that no view of things is henceforth admissible which contradicts these facts and their necessary meaning.

If a man, in order to shoot a hare, were to discharge thousands of guns on a great moor in all possible directions; if, in order to get into a locked-up room, he were to buy ten thousand casual keys, and try them all; if, in

order to have a house, he were to build a town, and leave all the other houses to wind and weather,—assuredly no one would call such proceedings purposeful, and still less would any one conjecture behind these proceedings a higher wisdom, unrevealed reasons, and superior prudence.[58] But whoever will study the modern scientific laws of the conservation and propagation of species, even of those species the purpose of which we cannot see, as, *e.g.*, the intestinal worms, will everywhere find an enormous waste of vital germs. From the pollen of the plant to the fertilised seed, from the seed to the germinating plant, from this to the full-grown plant bearing seed in its turn, we constantly see repeated the mechanism which, through thousandfold production for immediate destruction, and through the casual coincidence of favourable conditions, maintains life, so far as we see it maintained in the existing state of things. The perishing of vital germs, the abortion of the process begun, is the rule; the 'natural' development is a special case among thousands; it is the exception, and this exception is the result of that Nature whose purposeful self-conservation the teleologist short-

[58] Wigand, D. Darwinismus u. d. Naturforschung Newtons u. Cuviers, Braunschw. 1874, i. 421, has completely misunderstood this passage if he supposes that "the greatest purposelessness and fortuitousness are represented as the character of Nature;" whereas I am chiefly concerned to exhibit sharply the contrast between the way in which Nature and that in which man pursues a purpose. The procedure of a man who should act on the analogy of Nature must be described as extremely unpractical and purposeless; and this proves that the procedure of Nature (using this figurative expression for brevity) is in any case actively distinct in principle from that of man, and that accordingly the anthropomorphic form of teleology, of which only we are speaking in this connexion, is utterly untenable. That on my view the "utmost parcimony" is the purpose of Nature is in nowise suggested. What is done is simply to compare the action of Nature with that of man in following up a purpose. That Nature does in fact attain her purpose, as Wigand observes, as it were against my view, is the obvious presupposition of the whole inquiry. But when Wigand adds, "and that, too, without hindrance to other purposes," this is, like the whole of his subsequent remarks, nothing but optimistic metaphysic, to which, on the basis of the facts, a pessimistic might with at least equal justification be opposed. Comp. moreover, in the text the last paragraph on this subject, 'And yet there is another side to the matter,' &c. (p. 36).

sightedly admires. "We behold the face of nature," says Darwin,* "bright with gladness; we often see superabundance of food; we do not see, or we forget, that the birds which are idly singing round us mostly live on insects or seeds, and are thus constantly destroying life; or we forget how largely these songsters, or their eggs, or their nestlings, are destroyed by birds and beasts of prey; we do not always bear in mind that although food may be now superabundant, it is not so at all seasons of each recurring year." The struggle for a spot of earth, success or non-success in the persecution and extermination of other life, determines the propagation of plants and animals. Millions of spermatozoa, eggs, young creatures, hover between life and death that single individuals may develop themselves. Human reason knows no other ideal than the presence and perfection, as far as may be, of the life that has begun, combined with the limitation of births and deaths. To Nature luxuriant propagation and painful destruction are only two oppositely working forces which seek an equilibrium. Even for the 'civilised' world political economy has revealed the sad law that misery and famine are the great regulators of the increase of population. Nay, even in the intellectual sphere it seems to be the method of Nature that she flings a thousand equally gifted and aspiring spirits into wretchedness and despair in order to form a single genius, which owes its development to the favour of circumstances. Sympathy, the fairest flower of earthly organisms, breaks forth only at isolated points, and is even in the life of humanity more an ideal than one of its ordinary motives.

What we call Chance in the development of species is, of course, no chance in the sense of the universal laws of Nature, whose mighty activity calls forth all these effects; but it is, in the strictest sense of the word, chance, if we regard this expression in opposition to the results of a humanly calculating intelligence. Where, however, we find

* Origin of Species, 6th ed., p. 49.

adaptation in the organs of animals or plants, there we may assume that in the eternal slaughter of the weak countless less adapted forms were destroyed, so that here too that which maintains itself is only the favourable special case in the ocean of birth and death. This, then, would be, in fact, a fragment of the much-reviled philosophy of Empedokles, confirmed by the endless materials which only the last decades of exact research have brought to light.

And yet there is another side to the matter. Is it quite true, as the reviewer of Radenhausen thinks, that in place of mysteriously working causality we have only the "possibility" of happy accidents? What we see is not possibility but actuality. The single case seems to us only 'possible,' seems to us 'fortuitous,' because it is regulated by the activity of natural laws, which in our human apprehension have nothing to do with this special result of their reciprocal action. In the great whole, however, we can see the necessity. Amongst the countless cases the favourable ones too *must* happen; for they are actually there, and everything actual is produced by the eternal laws of the universe. In fact, this does not so much refute all teleology as afford an insight into the objective nature of the adaptiveness of the phenomenal world. We see clearly that this adaptiveness in the individual case has nothing human about it; nay, that, so far as we have yet observed, it is not brought about by higher wisdom, but by means which, in their logical value, are clearly and distinctly the lowest that we know. This estimate, however, is again only based on human nature, and so there remains for the metaphysical, the religious conception of things, which overpasses these limits in its imaginations, room for the setting up of a teleology which must be simply and definitively rejected from physical research and the critical philosophy of nature.

The study of the lower animals, which has made great strides in the last few decades, especially since Steenstrup's

discoveries on alternation of generation, not only discards the old idea of species, but it also throws remarkable light on a very different question, which is of the highest interest in the history of Materialism,—the question of the nature of the organic individual.[59] In connexion with the cell-theory, modern discoveries are beginning here also to exert so profound an influence on our scientific and philosophical views, that it looks as though the ancient questions of existence were now for the first time in a clear shape being submitted to the inquirer and thinker. We have seen how ancient Materialism fell into absolute contradiction by regarding the atoms as the only existent, though they cannot be the bearers of a higher unity, because without pressure and collision no contact takes place between them. But we also saw that precisely this contradiction of manifoldness and unity is peculiar to all human thought, and that it only becomes most obvious in Atomism. The only salvation here, too, consists in regarding the opposition of manifoldness and unity as a consequence of our organisation, in supposing that in the world of things in themselves it is resolved in some way unknown to us, or rather does not exist there. In this way we escape the inmost ground of the contradiction, which lies in the assumption of absolute unities, which are nowhere given to us. If we conceive all unity as relative, if we see in unity only the combination of our thought, we have indeed not embraced the inmost nature of things, but we have certainly made possible the consistency of the scientific view. It fares ill indeed with the absolute unity of self-consciousness, but it is not a misfortune to get rid of a favourite idea for some thousand

[59] We have allowed this passage of the first edition to follow here unaltered, although it has no longer a direct reference to Darwinism. 'Individual' and 'kind' belong together, at least in connexion with the theory of knowledge. It is the same synthetic process which brings the manifold in the phenomenon under the one as under the other of these notions, and the question as to the priority of the whole or the parts is at bottom only another form of the question as to the Platonic pre-existence of the idea compared with the individual existence.

years. In this section let us keep close to the more general phenomena of organic nature.

Goethe, whose Morphology may be regarded as one of the soundest and most fertile pieces of work done during the troubled age of our Philosophy of Nature, through his thoughtful study of the manifold forms and variations of the vegetable and animal world, had already attained the standpoint to which all our recent discoveries are forcibly carrying us. "Every living thing," he teaches, "is not a single thing, but a plurality; even in so far as it appears to us as an individual, it still remains a collection of living independent beings, which in idea and disposition are the same, but phenomenally may become the same or similar, other or dissimilar. Those beings are partly connected from their origin, partly find each other and combine. They divorce themselves and seek each other again, and so effect an endless production in all ways and in all directions. The more imperfect the creature is, the more are these parts the same or similar, and the more they resemble the whole. In the one case the whole is more or less like the parts, in the other the whole is unlike the parts. The more like the parts are to each other, the less are they subordinated to each other. The subordination of parts points to a more perfect creature."

Virchow, who has made use of this utterance of Goethe in an excellent essay on Atoms and Individuals,[60] is to be reckoned amongst those who by means of positive research and acute theory have contributed to throw light upon the relation of the beings whose inner community forms the 'individual.'

Pathology, hitherto a region of wild and superstitious preconceptions, was explained by him from the same cell-life, which in its normal phenomena produces the common life of the healthy individual. The individual, according to his explanation, is a "unitary community, in which all the parts co-operate towards a like object, or, as it may be otherwise expressed, are active on a definite

[60] Vier Reden über Leben u. Kranksein: Berlin, 1862, S. 37–76, esp. 58, 59.

plan." This object Virchow further declares to be an inner, immanent one. "The inner object is at the same time an external standard, beyond which the development of the living thing does not reach." The individual which bears its object and its standard within itself is, therefore, an *actual* unity in opposition to the merely conceptional unity of the atom.

Here, then, in the recognition of an immanent object, we have again the primitive formal element, with which our conception of Nature can so little dispense that we find it recognised even by Vogt. With a clearness of conception to which he has not otherwise accustomed us, he declares in his 'Pictures of Animal Life,' after he has explained how the first recognisable forms of the embryo proceed from the cell-masses of the yelk: "So that here again the organism as an individual is given only on the appearance of the form, while before there was only the shapeless material."[61] This utterance comes close to Aristotle. The form makes the essence of the individual; if this be so, we may also designate it *substance*, even though by a natural necessity it proceeds from the properties of the *matter*. These properties, when clearly seen, are in their turn only forms combining themselves into higher forms. The form, too, is the true logical core of force, when we once clear this idea of the false bye-idea of a compelling anthropomorphic violence. We only *see* form as we only *feel* force. If we regard the form of a thing, it is unity; if we disregard the form, it is multeity or matter, as we have explained in the chapter on Scholasticism.

Vogt, theoretically stricter, emphasises the metaphysical idea of unity; Virchow holds to the physiological idea, to

[61] Bilder aus d. Thierleben, Frankf. 1852, S. 233. As to the matter, the recently discovered monera, especially the Bathybius, seem to contradict it. But it is a difficult question how much individuality is to be assigned to such a living lump of slime. The structurelessness of the protoplasm creatures can certainly not be concluded from the failure of our means of examination to recognise a structure. On this light can only be shed if ever the mechanism of these simplest vital phenomena is explained up; but as yet we are far from this.

the community of the life-purpose, and this idea makes very clear to us the relativity of the antithesis of unity and multeity. In the vegetable world many regard as a unit not only the cell and the whole plant, but also the branch, the shoot, the leaf, the bud. For practical reasons we may choose the single shoot which can lead an independent existence as an individual; then the single cell is only a part of this, and the plant is a colony. The difference, however, is relative. If the single cell of a higher plant cannot lead an independent existence, but must remain surrounded by other cells, neither can the offshoot without being rooted either in the plant or in the ground. All life is possible only in connexion with the natural environment; and the idea of an independent life in the whole oak-tree is just as much an abstraction as in the smallest fragment of a fallen leaf. Our modern Aristotelians lay great stress upon this, that the organic part can only arise and only exist in the organism. But there is not much to be done with the mystical dominion of the whole over the part. The separated plant-cell carries on its cell-life in fact longer than the separated heart of the frog beats. If no fresh sap comes to the cell it dies, as in the like case the whole tree dies; the shorter or longer duration depends upon the circumstances, not upon the nature of the thing. Rather should we lay stress upon this, that plants do not collect together externally from cells, that the single cells do not form themselves directly from the nutritive element and so accede to the whole, but that they always arise in other cells by means of their division. In fact, the Aristotelian principle that the whole is before the part applies for the most part, as far as we can see, to the organic world; but the circumstance that Nature so proceeds as a rule by no means entitles us to attribute an absolute universality to this principle. The mere fact even of inoculation is enough to confine it to the narrow limits of ordinary empirical principles. In the last century experiments were very

popular in the transfusion of blood from one animal to another, and at least partially they succeeded.[62] In more recent times organic parts have been actually transferred from one body to another and brought to live, and yet our experimentation on this aspect of vital conditions has scarcely begun. Nay, in the lower plants we find, in fact, the fusion of two cells as well as the division, and in the lower animals the fusion of two individuals has been ascertained. The Radiopods, the descendants of the Vorticella, frequently approach each other, embrace each other, and there arises at the point of contact first flattening and then perfect fusion. A similar process of copulation occurs with the Gregarines, and even in the case of a worm, the Diplozoon, Siebold found that it arises through the fusion of two Diporpæ.[63]

Relative unity occurs amongst the lower animals very remarkably in those polyps which possess a common stem, on which there appears by gemmation a mass of creatures, which in a certain sense are to be regarded as independent, but in another sense only as organs of the entire stem. We are led to the supposition that in these beings even the voluntary movements are partly general, partly special in their nature; that the sensations of all these semi-independent stems stand related to each other, and yet have their separate operation too. Vogt is quite right when he calls the controversy as to the individuality of these beings a controversy as to the Kaiser's beard. "There occur gradual transitions. The individualisation step by step increases."[64]

[62] As is well known, these experiments have very recently been taken up again, and have repeatedly produced favourable results.

[63] Comp. Vogt, Bilder aus d. Thierl., S. 124–142. The recent discoveries on this head are briefly put together in Gegenbaur, Grundz. d. vergl. Anatomie, Leipz. 1870, S. 110 ff. Here we only call attention to the fact that (S. 112) in Actinosphaerium *three* individuals can unite in this manner. Comp. moreover, for the whole question, Haeckel's theory of individuality in the 'Generelle Morphologie,' i. 265 ff.

[64] One of the most remarkable facts in this subject is the *colonial* nervous system in the Bryozoa: cf. Gegenbaur, *l.c.*, S. 19 f.

So far in our first edition. We come back now to the notion of Species, and must first make some remarks which rest not so much on modern discoveries and observations, as on a more exact survey of the whole field, and of the principles of the struggle for existence. The first remark is this, that the notion of species, on more accurate inspection, reveals itself as a product of those times in which the attention of mankind was chiefly directed to the large or more highly organised creatures, and in which the microscope and all the infinite fulness of the lower animal and vegetable worlds were yet unknown. This becomes still plainer if we take into account, besides species, the genera, orders, and classes, which even in Linné's time appeared to embrace so admirably the entire animal world. Nowadays the whole network covers only the upper part of the animal series, and the lower we descend the more is the inquirer puzzled. A crowd of fresh marks appears, now agreeing, now crossing each other, to require even in the narrowest field a multiplicity of divisions and subdivisions, with which at the higher end of the series it was possible comfortably to embrace, *e.g.*, the whole 'typus' of the vertebrates. While, however, on the one side downwards the wealth of forms becomes so great that no logical network of ideas suffices to embrace it, on the other side the old-fashioned criterion of common descent here becomes utterly inconceivable. When, therefore, Haeckel, in his 'Philosophy of the Sponges,'[65] develops twelve different, partly natural, partly artificial systems merely from the narrower and wider view of the notion of species, we must descry in this neither an untrustworthy playing with marks nor an isolated anomaly. If man had commenced his study of natural beings with the lower animals, the idea of species, by many held so sacred, would probably never have arisen. The view which we must now form

[65] Die Kalkschwämme, eine Monographie in 2 Bdn., Berl. 1872, 1 Bd., 4 Abschn.; Philosophie der Kalkschwämme, S. 476 ff.

of the whole series of organisms is no longer that of a ladder in regular and intelligible succession from the lowest to the highest, but we have an enormous substructure to the whole system, which is still in continuous movement, and from this arise upwards the ever more firmly marked and clearly sundered forms of the higher plants and animals.

With this connects itself a second remark, which mainly applies to the higher organic forms. If, namely, we presuppose that these forms have in the course of long spaces of time so formed and marked themselves off from one another as we now see them before us, it necessarily follows from this that they must in general possess a high degree of stability, and that varieties and intermediate forms can no longer easily arise in free nature so long as the relative life-conditions of the species do not change with climate, cultivation, and other circumstances. For if we start from a condition of variability, and have the struggle for existence at work for long spaces of time, the best adapted forms must necessarily keep the ground; and, in fact, not only those which are best adapted in themselves, but also the best adapted combination of those species which, in the competition with each other, enable, as it were, the maximum of life to be maintained. Amongst the animals, for example, the hunger and the strength of the lion will bring themselves into a kind of equilibrium with the rapidity of the gazelle, with a simultaneous adaptation of both species to all other competitors for existence. This relation agrees with Fechner's 'principle of decreasing variability,' but is, as we conceive it, a simple consequence of the principles of the theory of evolution and the struggle for existence, while Fechner tries to develop *a priori* an entirely universal cosmical principle of this kind.[66]

[66] Fechner's principle of the tendency to stability has a certain similarity with the way in which Zöllner, by the aid of Schopenhauer's philosophy and the mechanical principle of the least compulsion, tries to de-

The consequences of this pretty obvious remark have not always been sufficiently kept in view. Otherwise, for example, the transitional forms which evolution postulates would not have caused so much difficulty. We may regard the influence of man as a variation of the natural conditions which make existence possible for certain forms, that in a state of nature would probably soon disappear again before the older forms which had maintained themselves in the struggle for existence. As it is, however, we see how man, in the case, for instance, of pigeons and dogs, in the course of a few generations reaches new forms, which, so long as they are kept under the same protecting conditions, very speedily attain the purity and exclusiveness of a separate species, and are only in deference to theory to be called 'varieties.'[67] And this by no means happens only in the case of 'artificial' selection, which strives after a definite model, but also in the case of 'unconscious' selection,[68] *i.e.*, in the case of a procedure which brings a variety to the ever greater perfection and persistence of a new type, through the simple effort to keep the race pure and to develop a peculiarity, so that for the rest Nature here strives freely, as it were, after a definite model, where a halt is made. If this is once attained, it may then maintain itself unaltered for any length of time.

duce that every system of atomic vibrations in a given space has the tendency to let the number of collisions (and thus of sensation and pain) fall to a minimum. In the principle of tendency to stability Fechner finds at the same time the reconciliation of causation and of teleology, since on this principle the earth must necessarily approximate to a condition in which "everything harmonises as well as possible" (Einige Ideen, &c., S. 83 ff.). Fechner's idea, as well as Zöllner's, are at present but boldly hazarded metaphysical notions, which as yet entirely lack proof and demonstration. If we limit ourselves, on the contrary, to the relative adaptation of organisms to the conditions of existence in a given extended period, then the tendency to stability follows immediately from the principle of the struggle for existence.

[67] Comp. Darwin, The Variation of Animals and Plants under Domestication, i. 32. Here it is shown that the domesticated pigeons, although they all descend from a single wild species, number more than a hundred and fifty kinds, and must be divided into at least five new classes if they are to be dealt with on the same principles as the wild classes.

[68] Darwin, *loc. cit.*, i. 214.

Similarly, then, we may also assume that the changes in organisms which have been left to themselves have not been completed with quite such imperceptible slowness as Darwin's own view seems to require, but that after every important change in the conditions of existence there has resulted, as it were by starts, a rapid development of some forms and a retrogression of others. We may very well assume also that every such disturbance of the natural equilibrium produces a tendency to variation, and thus gives opportunity for the origin of new forms, which rapidly establish and perfect themselves when the conditions are favourable to them. All the various principles which modern inquirers have introduced into the doctrine of descent in order to complement the principle of natural selection, as, *e.g.*, migration, the isolation of species, &c., are only more or less happily apprehended special aspects of the decisive main principle of the *disturbance of equilibrium*, which must necessarily produce the stability of species where the conditions long remain identical.

It is easy to see how by this view of the doctrine of transmutation a great many objections which have been raised against it are at once disposed of, while, on the other hand, Darwin's theory is modified in a very essential point.

Darwin's view so far runs quite parallel with Lyell's geology, in that chief importance is laid upon the silent and continuous, though to ordinary observation imperceptible, changes which are continually going on, but the result of which only becomes apparent in long periods of time. Agreeably with this view, Darwin supposed that modifications of species originally arise quite fortuitously, and that the majority of them again disappear, like ordinary malformations, without leaving any sign, while some few of them, which bring some advantage to their possessors in the struggle for existence, maintain and establish themselves through natural selection and heredity.

We must, of course, admit, even on our view, that very

slow modifications of form may occur, especially where they are produced by very slow modifications of the conditions of existence, as, *e.g.*, in the gradual elevation or depression of whole countries. But even in this case it will appear to us more probable that the organic forms oppose a certain resistance to the change in their life-conditions, which maintains their state unaltered until, when the disturbing influences reach a certain height, a disturbing crisis breaks in. This does not exclude, however, a gradual modification, and we do not wish our view of the attainment of a condition of equilibrium to be so taken as though it were a condition of absolute immutability. On the other hand, the development of new kinds from the purely fortuitous development of new qualities must indeed be doubted, so far at least as the main lever of the change is supposed to be found here.

Let us again remember that we have to deal with long periods of time, and that the general tendency to variation must have been greatest at the beginning of these periods. Then we can easily see that at a given moment of time the whole series of variations has, as it were, been tried, and that what at the beginning of the period has not led to a new kind will be ever less likely to do so, because the forms are ever slowly becoming more definite and disparate. But if we choose to consider the period which we here regard as the period of adaptation for the relations indicated as at least in itself exclusively governed by the law of the persistence of useful accidents, there arise further objections of different kinds.

First let us suppose that the period of adaptation follows upon a disturbance of equilibrium, and for that very reason involves an increased tendency to variation. Why now are we to exclude all immediate causal connexion between the change of the conditions of existence and the change of forms? Why, we are even now rightly restoring Lamarck to honour, who derived from immediately efficient causes combined with heredity all modifications of

forms, and therefore, *e.g.*, the increase, strengthening, and development of any organ from its increased use. But here many still unknown forces may be in operation, without our being therefore obliged to take refuge in a mystical intervention of the teleological principle. Fechner even brings in psychical influences too, and that without leaving the circle of the mechanical conception of nature, since psychical phenomena are at the same time physical.

"The cock," he says, "has spurs, a crest of feathers, a high red comb. The two first are explained on the principle of the struggle for existence. Cocks on which these had been fortuitously formed conquered their adversaries in fight by means of the spurs, and by the crest were better protected against bites, so that they remained masters of the field. But undoubtedly they must have waited long for these fortuitous arrangements to occur; and when we think that such accidents must be supposed in the case of all other animals, in order to explain the existence of all these adaptations, our brain will grow dizzy. I am more inclined to think that when the organisation was more easily variable than it is now, the psychical effort to be a vigorous match for the foe, to protect oneself against his attack, and the fury against him which still sets the spur in activity, ruffles the crest, and swells the comb, was able, if not to produce these parts by a suitable modification of the nutritive processes in existing cocks, yet to implant the disposition thereto in the germs, and so in their descendants; and here I regard, of course, the psychical efforts and conditions only as the inner side of the physical organisation on which these modifications depended, while I hold the whole play of psychical impulses as connected with their physical basis by the general principle of tendency to stability, without attempting a more precise explanation." [69]

We leave the value of this idea undetermined, only observing that there is just as little reason for rejecting

[69] Fechner, Einige Ideen, &c., S. 71 f.

it unexamined as for accepting it without proofs. Amongst other phenomena, however, which are difficult to explain from mere selection, there is one in particular which is very widely spread that seems to demand a direct and positive causal connexion between the form and the conditions of life. This is 'mimicry,' an adaptation extremely common, especially in insects, and leading to the most remarkable illusions, of the form and colour of animals to their environment, or even to other organisms.[70]

On the general principle this illusive imitation of strange forms seems to agree admirably with natural selection, for it is always a protection to the particular animal against its enemies. We may, therefore, easily suppose that individuals which have fortuitously undergone a modification of this protective kind must have lived longer and exercised a greater influence in the propagation of their kind than others. If this be once admitted, the protective adaptation of form and colour must necessarily have gone further. But here comes the great difficulty of explaining the first variation of a protective kind. An opponent of Darwin, Mr. Bennet,[71] has pointed out that the resemblance of many insects to the ground on which they live, to the colour of dry bark or fallen leaves, or to the bright colours of the flowers on which they commonly settle, comes about through so long a series of illusive traits and markings, that it is the less possible to admit the sudden appearance of such a variation, as the nearest related species often possess an entirely different aspect. Then Mr. Bennet goes on to argue that a fortuitous occurrence of *one portion* of this new marking would be of no advantage, because the creature would certainly not have deceived its enemies. But until by mere fortuitous variation, which may just as easily occur

[70] Comp. Wallace, Contributions to the Theory of Natural Selection.

[71] We follow an address of Mr. Bennet to the British Association at Liverpool, given in the Naturforscher, iv. No. 15, 1871, S. 118 ff, which is said to have "been approved by very competent inquirers."

in one direction as in another, the whole of the colour-marks and changes of form happen to meet so that the illusion is perfect, requires such a combination of coincidences that the probability against it is enormous. We must also assume enormous periods of time in order that a single such coincidence of all these modifications may be expected. In dealing with the questions of cosmogony, indeed, we have deliberately impugned the blind dread of great numbers; but here the case is very different. Mimicry can only be developed during a period of much the same climatic conditions, in the face of the same enemies and the same vegetation; and these periods must, generally speaking, not be made too long.

Darwin explains protective imitation by supposing the creature to have had originally a certain rough similarity with some element of its environment, so that natural selection would only have to develop further this important beginning, partly by more distinctly marking the protective similarity, partly too by adapting the habits of life to the employment of this protection. In fact this explanation seems the only one which is compatible with the exclusive application of the principle of selection. Instead of the fortuitous concourse of a quantity of delicate lines and combinations of colour, we should thus have a rough primitive whole, which at least in some cases could already deceive enemies, and thus give an impulse to the known process of natural selection. But now it must be observed that there are cases to which this kind of explanation cannot possibly be applied. These are all those cases in which the protective form, and especially the colour, deviates very strongly and strikingly from the forms and colours of the nearest related species. But such cases are uncommonly numerous. Bennet mentions a case where a kind of butterfly deviates very far from all its relatives, which are almost pure white, and imitates the brilliant colours of a butterfly of quite a different class. The latter is poisonous to birds, and is therefore avoided

by them; but the imitating butterfly, which would agree very well with the birds, protects itself by its likeness to the poisonous butterfly.

These, and like cases, must necessarily lead us to assume other, though it may be yet unknown, factors, which produce the phenomena of mimicry. That rational science will not, despite the difficulty of these cases, take refuge in a mystically interfering teleological force, but here too will apply the axiom of the intelligibleness of the world, is of course obvious. Here comes to our aid the fact that an influence of the environment on the colouring of animals, in all probability produced through the eyes and nervous system, is otherwise not unknown. We refer here particularly to Pouchet's experiments on colour-changes in turbot and perch.[72] That fish very frequently have the colouring of the ground at the bottom of the water had long been known, and it need not be doubted that in this very simple 'mimicry' natural selection has often been the chief cause. But in Pouchet's experiments these fish change their colour within a few hours, according to the colour of the bottom on which they are placed. Even though there exists in the variable pigment cells of the fish a mechanism which we shall hardly find in the wings of insects, and which makes the phenomena of this rapid change of colour intelligible, yet the main point in the two cases is quite analogous, viz., that the colours of external objects through the mediation of the nervous system produce analogous colours in the animal. Whether the nerve-changes in question are connected with an internal excitation of desire and will may be regarded as quite indifferent. The solution of the problem, or rather the core of the problem to be resolved, lies in the still undiscovered mechanism which brings about the effect, and which may very well be ranked with the 'ordered reflexes,' as soon as we familiarise ourselves with the idea that, besides the instantaneously acting reflex processes, there

[72] Naturforscher, iv. No. 38, 1871, S. 310 f.

may also be very slowly acting ones, of which the result, it may be, only appears in the course of generations. That these reflex actions, like the well-known regular reflex actions in the spinal marrow of vertebrates, are at the same time purposeful, may then again be very simply referred to the old Empedoklean principle that only the purposeful can maintain and develop itself, while misformations, which in themselves may be equally possible and frequent, perish and disappear without any trace.

The view here put forward as the most natural and probable must by no means be supposed to set aside natural selection and the struggle for existence. On the contrary, we regard these powerful levers of all development as equally proved both empirically and rationally, and they seem to us to co-operate under all circumstances with the more positive influences on the origination of forms, in such a way that the true completion and elaboration of all forms, the elimination of imperfect intermediate forms, and the entire maintenance of the equilibrium amongst organisms, essentially rest on this great factor introduced by Darwin into natural science.

We must not, indeed, overlook the fact that even in the completion and elaboration of organic forms other, and those more positive factors, may co-operate, with which natural selection and the struggle for existence are connected only as a great regulator, promoting what is perfect and destroying what is imperfect. Let us mention, to begin with, the principle so often pointed out by Darwin himself of the 'correlation of growth.'[73] According to this principle, modifications of form, which have in themselves nothing to do with the struggle for existence, arise as necessary consequences of a prior modification determined by natural selection; and, in fact, the connexion of the secondary modifications thus arising with the primary ones is sometimes easy to see, but sometimes

[73] Origin of Species, 6th ed., 114–118; Variation of Plants and Animals.

utterly obscure. That, *e.g.*, the heavy pendulous ears of some kinds of rabbits must exert a modifying pressure on the skull is easy to understand on mechanical principles; that where the fore-limbs are strongly developed the hind-limbs have a tendency to become slighter, seems equally intelligible; but why, *e.g.*, white cats with blue eyes are generally deaf, why scarlet-coloured dahlias have their coronal leaves indented, is for the present utterly incomprehensible to us. As, however, such connexions exist in very great number, we see that there obtain in the structure of organisms laws of formation which are still unknown to us, not only in the extent, but even as to the very character of their operation. But it is, of course, not necessary to think of forces as yet unknown to us; a peculiar combination of well-known natural forces is enough to explain these striking consequences, which may be summed up with Darwin: that there never occurs a modification of any single part with a maintenance of all the other peculiarities of the form.

The generally operating laws of formation which are here manifested are, however, probably the same which in some circumstances form purely 'morphological kinds,' without any demonstrable advantage in the struggle for existence. The origin of such forms was first emphatically maintained by Nägeli, who combined with this the view that there is in organisms an innate tendency to progressive development. Darwin in the later editions of his work has recognised the existence of morphological characters, without, however, adopting the doctrine of the natural tendency to progressive development, which, in fact, at first sight seems to conflict sharply with the whole of Darwinism.[74] So, too, Kölliker conceives the law of the development of organisms, which he assumes, to be in-

[74] Origin of Species, 6th ed., 170. Comp. Nägeli, Entstehung u. Begriff der naturhist. Art, Münch. 1865; and also Oscar Schmidt, Theory of Descent and Darwinism, p. 156.

compatible with Darwin's hypothesis.[75] The main defect of this hypothesis he finds in the laying down of the principle of utility as the basis of the whole, and a basis which 'is meaningless.' We are so far entirely agreed with Kölliker that positive causes of development must be assumed which have their explanation not in the principle of utility, but in the internal disposition of organisms; but besides all these positive causes, the principle of utility has a meaning in combination with the law of the struggle for existence, which in a negative way controls the blind stress of origin and growth, and separates the actual forms from those which are possible according to the 'law of development.'

Kölliker observes that Darwin, as well as his followers, in explaining variation had also thought of internal causes; "but in doing this they abandon the ground of their hypothesis and take the side of those who assume a law of development, and lay down as the causes of their modification internal causes lying in the organisms themselves."

It is true that Darwin, with that splendid and so often successful one-sidedness which we find with especial frequency amongst Englishmen, has carried out his principle as though he must deduce everything from it exclusively; and as the principle, as we presuppose, has everywhere a decisive action in the production of the actual, this proceeding can naturally be carried very far. The everywhere *co-operating* cause was treated as though it was the only cause, but a dogmatic assertion that it is the only one is not a necessary part of the system. Wherever Darwin sees himself led to the co-operation of internal causes, he adopts it into his explanation of natural forms so unhesitatingly, that we are rather led to suppose that he regards it as self-intelligible. That he draws as little as possible from this source, and, on the contrary, as much as

[75] Kölliker, Morphologie u. Entwickelungsgesch. des Pennatuliden-stammes, &c.: Frankf. 1872; esp. S. 26 ff.

possible from natural selection, is again for him, as the advocate of a new scientific principle, an entirely correct method; for the effect of selection, that is natural, explained by artificial selection, is entirely intelligible—at least on its negative and regulative side, which we have repeatedly pointed out as the important point. The struggle for existence is completely clear to us, and any reduction of a phenomenon to this great factor of creation is therefore a real explanation, while recourse to the laws of development is for the present only to refer us to the future, when some day, perhaps, we may gain an insight into the nature of these laws of development.

Nevertheless, the services of Nägeli and Kölliker in pointing out the positive and inner causes of formation are to be very highly estimated, and a philosophical and critical examination of the whole problem of development will do justice to both points, and must bring into the true connexion their contributions to the understanding of phenomena.

A specially striking example of the action of a law of development is rightly found in the transformation of some examples of the branchial axolotl into a gill-less newt-form. Of some hundreds of these creatures brought from Mexico to Paris, the great majority remained at the lower stage; some few crept to land and became lunged and air-breathing animals. They attained a form to which their earlier form is related as a larva-form or as an earlier stage of development, so that the whole phenomenon immediately connected itself with a series of already known phenomena. As a rule, indeed, an animal which passes through several stadia of development must reach the highest stage before it can propagate itself; but there are now many known exceptions to this rule; nay, we can actually prevent the tritons from reaching their last stage of development. If they are kept in a closed water-basin, they do not lose their branchiæ, but remain at the stage of the water-newt, and become at the same time sexually

mature and reproduce themselves. In like manner peculiar conditions of existence not unfrequently produce similar changes without the co-operation of man; *e.g.*, that one kind of frog passes through the tadpole state in the egg and jumps from the egg as a ready-made frog. In all these cases the co-operation of inner formative causes with the conditions of existence is obvious, and it cannot be denied that natural selection plays the decisive part in some of them, though in the transformation of the axolotl, which suddenly changes from a water-creature into an air-creature, there can be no question of natural selection or the struggle for existence. From the standpoint of one-sided Darwinism the thing can only be explained by bringing the whole transformation under the notion of variation, and perhaps making the removal into another climate the occasion of the variation. In wild nature the new form would now have to undergo the struggle for existence, and to fix itself by breeding in before the process of forming a species would be completed. But it is very easily seen that such an extension of the notion of variation really includes everything that the champions of the law of development can require; for nobody will believe that this change is an accidental one, compared with which any other conceivable change might just as well have occurred; but we see that here a movement was made in, as it were, a predescribed course.[76]

The whole difficulty of understanding lies in rightly apprehending the notion of the law of development. The word sounds somewhat suspicious to many men of science, much as if we spoke of a 'plan of creation,' implying a succession of repeated interferences of supernatural forces. There is, however, not the least reason in the 'inner causes,' of which we are here speaking, to presuppose any mystical assistance to the wonted course of natural forces. So that the 'law of development' also, according to which organisms rise in a definite gradation,

[76] Haeckel, N. Schöpfungsgesch., 4 Aufl., S. 315 f., E.T. 354.

can be nothing else than the co-operation, conceived as a unity, of the universal laws of Nature in order to produce the phenomenon of development. Kölliker's 'law of development,' just as well as the numerous laws of formation which Haeckel propounds, is, logically considered, primarily only a so-called 'empirical law,' *i.e.*, a collection, drawn from experience, of certain rules in natural phenomena, whose ultimate causes we do not yet know. We may, however, attempt to form a picture to ourselves of the true natural causes which underlie the law of development, even were it only to show that there is not the slightest occasion to take refuge in a mystical conception.

Haeckel has expressed the idea that his plastid theory is to be reduced to a carbon theory, *i.e.*, that we are to seek in carbon—of course in some way as yet completely obscure to us—for the cause of the peculiar movements which we observe in protoplasm, and which we regard as the elements of all vital phenomena. This idea does not carry us very far, but we may here employ it as a point of connexion in order to explain our idea of the nature of the law of development.

If we look somewhat closely into the chemistry of carbon compounds, we find that there already exists a complete theory for the formation of organic acids, which we may very well compare with a law of development. The 'plan' of this whole development lies predescribed in the doctrine of the 'quantivalence' of atoms; and as by a fixed principle of substitution any given organic acid can, as it were, be developed onward into another, we have a possibility, running, as it seems, to infinity, of ever more complicated and ever more manifold formations before us, which, despite their enormous multitude, follow only a narrow and predescribed course. What can or can not arise is determined in advance by certain hypothetical properties of the molecules.[77]

[77] Weihrich, Ansichten d. neueren Chemie: Mainz, 1872, S. 43 f., refers to Kolbe's theory, on which an atom of hydrogen can be replaced by me-

We might here break off, and simply compare the plan, known in its main features, of all possible organic substances, as an illustration, with the as yet unknown plan of all possible animal forms. We will go, however, a step farther, and refer to the connexion between the form of crystals and the mode of composition of the crystallised matter. That a similar connexion exists between matter and form even in organisms is no new idea. The analogy is obvious, and has often been employed for many purposes. That this brings us back finally to peculiarities of the molecules is very natural. For our purpose it is quite indifferent whether the form is brought into combination with a definite animal material, which has a definite position in the genealogical tree of materials, or whether it is regarded as the result of a co-operation of all the materials present in an animal body; and both may at bottom come to the same thing. It is enough to admit any kind of connexion between form and matter, and we have before us the law of development of organisms in the most palpable shape as the law of substitution of carbon compounds.

Whether this be so or not, in any case this illustration will suffice to show that we need not conceive the law of development as anything supernatural or mystical, and thus the chief obstacle to the recognition of its importance will be removed. The law of development gives the *possible* forms; natural selection from their enormous multitude chooses the *actual* forms; but it can summon forth nothing that is not contained in the plan of organisms, and the mere principle of utility becomes impotent if a modification of the animal is required of it which is

thyl, C_2H_3. The methyl itself contains hydrogen, for each atom of which an atom of methyl may be substituted. By such substitutions formic acid is turned into acetic acid, acetic acid into propionic acid, this into butyric acid, and so on. Of course the general idea developed in the text is independent of this special theory; but this latter shows very well what may be conceived as a law of development, so far as the more complex formations are imagined as successively arising out of the more simple.

against the law of development. But this does not touch Darwin, since he chooses only what is useful amongst the spontaneously occurring variations. His doctrine is only completed in so far as we must assume that the circle of possible variations is determined by a universal law of development.

We might now suppose that the assumption of such a law of development renders the theory of natural selection superfluous, since the multitude of forms must be produced in course of time without any selection. Such a view overlooks, in the first place, the enormous importance of the competition for existence, which is not a theory, but a demonstrated fact. At the same time we must maintain that the law of development, no matter what we imagine to lie behind it, is at all events not a dæmonically working power producing unconditionally the pure forms answering its requirements. If even in crystallisation, where the conditions are so much simpler, we discover the most manifold irregularities, so that the crystal of theory is strictly only an ideal, we shall easily understand in the case of organisms, that the law of development cannot prevent perturbations and malformations of all kinds, mixed forms by the side of pure ones, imperfections beside the type, although it exercises its influence upon all the forms that occur. But if even the pure forms, according to the law of development, run into infinity, the possible number becomes very much greater through the modified forms, and yet it remains always a mere fraction of what is conceivable. Everything cannot come from everything, as even the ancient Materialists understood. Amongst this luxuriant multitude of forms comes now the struggle for existence, ordering and sifting, and establishes the equilibrium described above, which we recognised as the maximum of simultaneously possible life. Whether those forms to which natural selection finally leads, and which it renders stable, are finally at the same time the purest types according to the law of development, may remain

undetermined; but at all events, we shall assume that the stability of species is the greater the more often this coincidence is attained.

A more serious question which here presents itself is whether, on the assumption of a mechanically working law of development, the apparently like primitive forms of organisms, from which we deduce all living forms, are to be considered as really constituted alike or not? In putting this question, we do not wish to shake that law which the most influential representatives of the doctrine of descent declare so extremely important—the law of the agreement of 'ontogeny' and 'phylogeny,' as Haeckel says, or the doctrine that in each creature the stadia of its prehistory are summarily repeated in the history of its own development, especially in fœtal life. We will, in the first place, only remark that this law is indeed of great heuristic importance to the theorists of the doctrine of descent, but that its necessity is precisely from the standpoint of pure Darwinism difficult to understand. Of advantage in the struggle for existence from traversing these stadia there can be no question, and the principle of heredity is not so unconditionally valid that it could explain this correspondence. It can hardly be, then, but that there are chemical and physical causes present which render it necessary to traverse these stadia, and in this there is already involved the recognition of the law of development as we conceive it.

If now it is asked whether the forms which look the same or like in the first stadia of development are also really constituted alike, we may infer the contrary simply from the fact that they produce a different result. If, *e.g.*, the embryo of the dog has a striking likeness to that of man in the fourth week, yet from the one is produced a dog and from the other a human being. It might be supposed that this not unimportant difference was only gradually developed through the one of the two like embryos being constantly nourished by the juices of a

dog, and the other by those of a human being; but this somewhat crude way of looking at the matter will not answer, *e.g.*, in the case of the eggs of a bird. If we think of the principle, so well demonstrated by Darwin, of the transmission of acquired qualities, we shall soon see how much more subtly we must here represent to ourselves the true state of the case. Let us take, *e.g.*, two pigeon's eggs, one of which contains an individual possessing the hereditary disposition to tumble in the air, the other as like an individual as possible, but without this disposition. Where now lies the difference? It can no longer come from without; it must lurk in the egg; but how we do not know. All that we now know is that this likeness of external appearance is infinitely removed from essential likeness. Haeckel, who lays very great weight on the identity of the first stadia, because he descries in it a speaking testimony for the original essential unity of all organisms, recognises at the same time the necessity of assuming internal differences. "The differences," he says, "which really exist between the eggs of different mammals and that of man do not exist in the form, but in the chemical mixture, in the molecular composition of the albuminous combination of carbon, of which the egg essentially consists. These minute individual differences of eggs, which depend upon indirect or potential adaptation (and especially upon the law of individual adaptation), are, indeed, not directly perceptible to the exceedingly imperfect senses of man, but are cognisable through indirect means as the primary causes of the difference of all individuals." [78]

[78] Haeckel, Hist. of Creation, E.T. i. 296. Again he says very rightly at p. 334: "All the vital phenomena, and, above all, the two fundamental phenomena of nutrition and propagation, are purely physico-chemical processes, and directly dependent on the material nature of the organism, just as all physical and chemical qualities of every crystal are determined solely by its material composition." In the 'Generelle Morphologie,' i. S. 198, Haeckel says: "We know that these very simple beginnings of all organic individuals are unlike in kind, and that extremely slight differences in their material composition, in the constitution of

Chemical differences are, however, essential differences; and accordingly we have before us in the similar eggs things which are essentially very different, though obviously by a general but as yet unknown law they are brought into externally similar forms. Whether differences of *structure* do not also co-operate, we do not know. For what do we mean when we speak of the absence of structure in protoplasm? Surely nothing more than that we, with our coarse methods of observation, cannot recognise any structure. So long as the movements of protoplasm are not mechanically explained, the question of its structure must remain an open one.[79] And ultimately even the chemical constitution of the molecule is structure!

their albuminous compound, suffice to effect the resulting differences of their embryonic development. For it is certainly only such extremely slight differences which produce, *e.g.*, the hereditary transmission of individual ancestral qualities to the offspring through the minimum quantity of albumen in the spermatozoon."

But should we not draw further consequences from this correct view, in which the importance of "internal causes" for development appear in the clearest light? Must not, in particular, the exaggerated importance which is attributed to merely morphological likeness disappear before the fact that we find the most important differences in creatures already established in the germ, while, with our means of observation, we cannot as yet even contemplate the possibility of directly exhibiting the differences? Assuredly no one will find unimportant the first basis of the difference between Mozart and an utterly unmusical man, or even the first difference between Goethe and a fowl, merely because it is connected with an infinitesimally small material quantity. The fact, however, that this quantity is something to us as yet quite inappreciable, justifies the man of science in not specially concerning himself with it, and so engaging in fruitless inquiries. And, moreover, in a professedly purely morphological inquiry this inappreciable quantity may be disregarded; only that then as soon as we wish to form an idea of the nature of development, where the morphological aspect of the matter is not sufficient, to neglect this quantity would be to commit as bad a blunder as it would be to omit one of the most important factors in a calculation because it is unknown to us; for here, of course, we are no longer concerned with the material quantity in itself, but with the importance of the consequences of its presence.

[79] Comp. Preyer, Ueber die Erforschung des Lebens, Jena, 1873, S. 22: "Through the movements of the protoplasm in the tiny germ of a seed of corn, the environing earth, air, and water are transformed under the influence of heat into a giant tree; and through the movement of the protoplasm in the warmed egg, its contents are transformed into a living creature. What gives the impulse? What makes the materials so arrange themselves that life results from them? In vain does chemistry grope for an answer."

Let us imagine the ready-hewn stones for a Gothic and a Byzantine cathedral so piled up, on two sites of like form and most limited dimensions, as to use every inch of space, and that the two heaps attain the same external shape. Then it is very easily conceivable that these masses of material at some distance appear like two exactly similar structures. But if the stones are separated and properly put together, from the one of these piles there can only result the Gothic, and from the other the Byzantine cathedral.

If this is once recognised, we must also draw the consequences, partly by recognising that chemical relations have their rule, and, as it were, their plan of development, but partly, too, by appreciating the whole attitude of morphology to the genesis of organisms. We must, that is, admit the principle that unknown peculiarities of matter, probably chemical, may exercise a decisive influence on the development of beings, on their future form and their modes of life, although these very peculiarities are already present in the first elementary forms without producing any difference cognisable by us.

What is true for the individual must, however, be true also for the whole sum of organisms in their historical development: the simple primitive forms, which all beings must pass through, are not necessarily essentially the same. They may, in a subtler and to us incognisable structure, or in their chemical composition, be as different as they are morphologically alike. However important, therefore, Haeckel's gastrula theory may be for the completion of morphology, and as the hypothetical complement of the whole doctrine of descent, we can never find in it a proof of 'monophyletic' descent, *i.e.*, of the origin of all organisms from one and the same species of primitive creatures.[80]

[80] In the Gen. Morph., i. 198, Haeckel observes: "It is, in our view, for the essential principles of organic development pretty indifferent whether in the primeval sea, when the first autogony took place,

A priori, it is, of course, very much more probable that from the beginning of life there was a greater number of germs not completely alike and not equally capable of development, whether these germs came from the meteoric dust of cosmical space, or whether life developed itself from the monera of the ocean depths. But if special weight is laid upon the 'polyphyletic' origin of organisms, because it seems to offer a means of sundering man from the rest of the animal world, we shall in the next chapter have an opportunity of showing that no deeper philosophical interest depends upon this possibility. The strife of opinions may, therefore, have free course here in the apprehension and appreciation of facts. Principles are only concerned so far as the question of the law of development is concerned, which, however, does not receive its decision here. If an extreme Darwinism would so understand monophyletic descent as to deny all differences in the internal constitution of the primitive organic forms, and refer all the differences that have resulted, to natural selection without any co-operation whatever of internal causes of development, this would be, indeed, a very consistent metaphysic, but a very improbable scientific theory. On the other hand, the moderate and cautious way in which Haeckel declares monophyletic descent to be more probable, at least for the animal world, and especially for the higher forms

there arose in different localities numerous originally different monera, or whether many monera of the same kind arose, which only afterwards became differentiated (through slight changes in the atomistic composition of the albumen)." That Haeckel since then has gone over more and more to the one-sided assertion of monophyletic descent—for he regards as especially important the proof of the gastrula form in the calcareous sponges—we may explain as a too great predominance of the purely morphological point of view. Haeckel has, when speaking of the theory of individuality (Gen. Morph., i. 265 ff.), luminously distinguished between morphological and physiological individuality. If we would apply the same distinction to the doctrine of descent, there would, in our opinion, be no serious objection to make against a merely morphological monophyletism, yet we regard the question of the internal constitution and its relation to the necessary future development as still more important.

of it, is thoroughly admissible.[81] For this purpose we rest chiefly upon the doctrine of the 'centre of creation' of each single species and each genus, and this doctrine is in turn empirically supported by the observation that the often curiously marked sphere of extension of species may, as a rule, be very well explained by assuming a particular point of origin, and by examining the possibilities of migration from this point with regard to the probable earlier condition of the earth.

That in this whole doctrine there is very much that is hypothetical and doubtful does not affect its value, since we are dealing with the first foundation of a history of organisms. An exacter examination, a stricter weighing of probabilities, will here, as everywhere, come with the progress of science. On the other hand, we must remember that the whole doctrine of the unitary centre of creation, if it is not to become metaphysical and even mystical, can only be a maxim of research and a generally valid empirical observation. To a generalisation by induction it by no means lends itself, as no natural cause is conceivable which should prevent one and the same new species from proceeding from a widely spread parent form at two different points at the same time. For the same reason we must not over-estimate the support given to the monophyletic theory by the doctrine of centres of creation. The latter theory might be shown to be correct in nine cases out of ten, without its therefore following that the

[81] Nat. Hist. of Creat., E.T., ii. 45. The proposition there expressed, that in general monophyletic hypotheses have greater integral probability than polyphyletic, is not the simple conversion of our proposition in the text. The latter relates exclusively to the first origin of life, so far as we can judge of its conditions and conclude from these to the course of events. Haeckel, on the contrary, has in view the descent of any given existing species or hypothetical primitive form with regard to the question whether this form was originally formed in different places and with corresponding variations, or only in one place and in like form, so that, *e.g.*, a widely dispersed occurrence of a species would have to be referred to migration, not to simultaneous origin in different places. Comp. the preceding note.

first origin of the simplest organisms must have proceeded from such a unitary centre.

The whole question receives, of course, another aspect if we confine ourselves strictly to the morphological point of view; for here at least causes are conceivable which might compel all organisms to run through a certain gradation of forms, all the same whether their inner nature —by which we mean primarily their chemical composition—were identical or not. Yet the difference would even then show itself in this, that the one kind of these organisms must remain constantly in the lowest stages, while the other under the influence of natural selection and of the immanent law of development would rise into higher forms.

We cannot undertake to discuss here all the numerous formally and materially interesting questions which have been raised by Darwinism and its opponents. The essential thing for us is to show how all the improvements and limitations which have been and yet may be introduced into Darwin's doctrine, must at bottom be made always on the same ground of a rational study of nature, admitting only intelligible causes. The strict application of the principle of causality, with the rejection of all vague hypotheses of forces which are drawn from mere notions, must remain the guiding principle for the whole field of natural science, and what there may be in this consistent elaboration of the mechanical cosmology unsatisfying and repulsive to our feelings will, as we shall sufficiently show, find its compensation in another sphere.

If, therefore, the opposition to Darwin proceeds in part openly, in part half unconsciously, from predilection for the old teleological view of the world, sound criticism can only in answer draw the line, that no opposition is scientifically justified which does not just as much as Darwinism itself start from the principle of the intelligibleness of the world, joined with the thorough application of the principle of causality. Wherever, therefore, in

calling in the aid of a 'plan of creation' and similar notions, the idea lurks that from such source a foreign factor may be introduced into the regular course of natural forces, then we are no longer in the sphere of science, but of a confused mixture of scientific and metaphysical, or rather as a rule theological views. Every interference of a mystical power, that turns a number of molecules from the path in which they move according to the universal laws of Nature, in order to dispose and order them, as it were, upon a plan—every such interference would, in a scientific view, produce an effect which may be measured by equivalents, while it yet disturbs the series of equivalents, just like a slip of the pen in a correct equation, which spoils the whole result. The whole 'plan of creation' which we recognise, the whole result of previous scientific discoveries, this beautiful harmony of an all-embracing equal and unitary law, would be broken down like a fragile toy. And wherefore? In place of an as yet imperfect but real understanding to patch on a fragment from a view of the world on which only a feeble analogue of an explanation, only a classification of phenomena by empty notions and gross anthropomorphic phantasies, is possible.

All these inadmissible violations of the causal series may be ultimately referred to the nature of the false teleology on which we shall still have a few words to say. Meanwhile there is also a teleology which is not only compatible with Darwinism, but is almost identical with it, and there are ideal developments and speculative extensions of this correct teleology which lie in a transcendental sphere, but for this very reason can never come into conflict with the natural sciences.

If Darwinism, as compared with the gross anthropomorphic teleology, appears as a theory of chance, this is only its thoroughly justified negative side. Adaptations proceed from the conservation of relatively fortuitous formations, but these formations can only be called fortuitous

so far as we can assign no reason why this particular form appears at this moment. In the great whole everything, and therefore even the appearance of those formations which by adaptation and transmission become the basis of new creations, is necessary and determined by eternal laws. These laws indeed do not immediately produce what is adapted, but they produce a multitude of variations, a multitude of germs, in which the special case of what is adapted, of the persistent, is perhaps relatively very rare. We have shown that this mode of forming adaptations, judged by *human* views of adaptation, is very low; but man is just the most complicated of all the innumerable organisms that we know, and is furnished with an infinitely complex apparatus, in order to meet special needs in the most special and peculiar way. The mechanism which accomplishes this remains hidden from his own consciousness, and human or quasi-human activity seems therefore to rough and unscientific observation as an immediate effect of force exerted by mere thought upon its object, while it is, in fact, only that which is most subtly effected. If we get rid of the errors arising from this source, the mechanism by which nature attains its ends is through its *universality* at least as high, as human purposefulness through its *rank* as the most perfect special case. It might be easily demonstrated that even in the highest actions of man this principle of the conservation of what is relatively best adapted still plays its part, everywhere co-operating with the most subtle apparatus of a specific reaction. Even the great discoveries and inventions, which form the basis of higher civilisation and intellectual progress, are still subordinate to that universal law of the conservation of the strongest, while they are at the same time tested by the most delicate methods of science and art.

The whole question of correct teleology may be reduced to this, that we inquire how far something may be found in this arrangement of nature, combined with the mechani-

cally operating law of development, that can be compared to a 'cosmical plan.' If we carefully discard anything pointing to a humanly scheming 'architect of the universe,' the logical core of the question remains: Is this world a special case among innumerable equally conceivable worlds, which would remain eternally chaotic or eternally inert, or must we assert that whatever might be the constitution of the beginning of things on the Darwinian principle, there must finally result order, beauty, perfection, in the same manner in which we see them? We may also extend this question, and doubt whether an ordered and self-developing world would necessarily be intelligible to the human mind, which needs definite classes and species of things for its guidance, or whether such a multiplicity of forms and phenomena might not be conceivable, that it must necessarily remain unintelligible to a being organised after the manner of man.

It will doubtless be admitted that our world may be called a special case in this sense, for however possible it may be to deduce all existence mathematically from simple assumptions, yet positive assumptions must be made, and such assumptions as make the development of our world possible, while without this consideration they might be quite different. In this respect even Empedokles is not without teleological elements, for however consistently he makes the adaptation of the individual arise from the mere trial of all possible combinations, yet the play of combination and separation on the whole necessarily results from the properties of the four elements and the two moving forces. Let us only suppose the latter omitted, and we have eternal inertia or eternal chaos. It is just the same with the system of the Atomists. Here we may indeed use the doctrine of the infinity of worlds, in order to make the special case of our world relatively accidental, yet the necessary bases of an intelligible world are found in the fundamental assumptions as to the properties of the atoms and their mode of motion. Let us suppose, *e.g.*, a world

with only round and smooth atoms, and no part of that fixed order of things which we see around us can be formed. Here, in fact, conscious application has been made of the principle of the intelligibleness of the world, in order to make the world a special case, in the very subtle and profoundly conceived theory of the limits to the variety in the forms of atoms.

In the Kantian philosophy, therefore, which has sounded these questions deeper than any other, the first stage of teleology is directly identified with the principle which we have repeatedly spoken of as the axiom of the intelligibleness of the world, and Darwinism in the wider sense of the word, *i.e.*, the doctrine of a scientifically intelligible theory of descent, not only does not stand in contradiction with this teleology, but, on the contrary, is its necessary presupposition. The 'formal' finality of the world is nothing else than its adaptation to our understanding, and this adaptation just as necessarily demands the unconditional dominion of the law of causality without mystical interferences of any kind, as, on the other hand, it presupposes the comprehensibility of things by their ordering into definite forms.[82]

Kant, indeed, goes on to lay down a second stage of teleology, the 'objective;' and here Kant himself, as in the doctrine of free will, has not everywhere strictly drawn the line of what is critically admissible; but even this doctrine does not come into conflict with the scientific taste of natural research. On this view we regard organisms as beings in which every part is throughout deter-

[82] The interpretation of the Kantian teleology here put forward is indeed not the usual one. We follow partly our own studies, but partly the recently published luminous investigation of August Stadler, Kant's Teleologie u. ihre erkenntniss-theoretische Bedeutung: Berlin, 1874. If Stadler, perhaps, here and there goes too far in establishing an entire agreement between Kant and the principles of natural science and under-estimates real weaknesses in Kant, on the other hand, the proof that only this interpretation answers to the principles of the transcendental philosophy and reduces the contradictions in Kant to a minimum is completely established by Stadler. As we cannot here go further into detail, we simply refer to this treatise.

mined by every other part, and we shall thus be brought, by means of the rational idea of an absolute reciprocal determination of the parts of the universe, to regard them as if they were the product of an intelligence. Kant regards this conception as indemonstrable and as demonstrating nothing, but he wrongly regards it as at the same time a necessary consequence of the organisation of our reason. For the natural sciences, however, this 'objective' teleology, too, can never be anything but a heuristic principle; by it nothing is explained, and natural science only extends as far as the mechanical and causal explanation of things. If Kant believes that in the case of organisms this explanation will never be sufficient, this view—which is, moreover, not a necessary part of the system—is by no means to be understood as if the mechanical explanation of nature can ever strike upon a fixed limit, on the other side of which the teleological explanation would begin; rather Kant conceives the mechanical explanation of organisms as a process running on to infinity, in which there will always be an insoluble residuum, just as in the mechanical explanation of the universe. This view, however, does not conflict with the principle of scientific research, even though men of science may be for the most part inclined to form other ideas on this point, which lies beyond our experience.

For similar reasons Fechner's teleology also is scientifically not open to attack. He makes the principle of 'tendency to stability' mediate between causality and teleology, since he supposes that the universal laws of nature themselves of necessity gradually produce greater perfection, and in this he finds a teleological disposition of the universe which he further brings also into connexion with a creative intelligence. The principle of tendency to stability itself is at once a scientific hypothesis and a metaphysical idea, and it must submit to criticism from both sides; the rest consists of articles of faith which have their basis beyond the sphere of experience.

All the grosser and more palpable, on the contrary, does the false teleology appear in Hartmann's 'Philosophie des Unbewussten,'—that teleology which creates mechanical work out of nothing, and thereby destroys the causal connexion of nature. Hartmann protests, indeed, against the view that his 'finality' is "something existing in addition to or even despite causality," but his application of 'finality,' and especially his remarkable establishing of it by a supposed calculus of probability, show at once that this very interruption of the strict causal connexion of nature forms the basis of his whole philosophy, which is a complete return to the standpoint of the 'charcoal-burner' and of savage peoples.[83]

This apparent contradiction is easily explained by the way in which Hartmann distinguishes between mind and matter, mental and material causes. "Very far," says he of his teleology, "from denying the absolute validity of the law of causality, it rather presupposes it, and that not only for matter and matter, but also between mind and matter, and mind and mind." Immediately afterwards he very calmly develops the hypothesis that the efficient cause of any event, called M, is *not entirely* based in the concurrently operating material circumstances; that we must "further" look for the sufficient cause of M in the intellectual sphere.

The difficulty of a complete analysis of the concurrent material causes gives Hartmann no trouble. The cases are very rare "where the essential conditions of the phenomenon lie beyond a narrow circuit, and all the unessential circumstances need not be regarded." We look, therefore, in the "narrow circuit" with as much intelligence and science as we happen to possess; use, perhaps, a microscope, a thermometer, or something of the kind, and what we have not thus discovered does not exist or is unessential. If, after this, we have not found the

[83] Comp. Phil. des Unbewussten: zur Annahme von Zwecken in der Einleitendes. ii. Wie kommen wir Natur?

complete explanation of M, then "devil-devil" is at work.[84]

That even in the "narrow circuit" an infinity of forces and arrangements of a material kind is at work we must not assume; otherwise there would be no 'Philosophy of the Unconscious.' To the man of science it seems the proper thing in such cases simply to say that the physical cause of M is not yet discovered, and in the whole history of his never-resting science he will find the impulse to new researches, which ever lead him a step nearer to the goal. The Australian savage, however, and the Philosopher of the Unconscious halt where their power of natural explanation ceases, and attribute all the rest to a new principle, by which a single word very satisfactorily explains everything. The limit at which the physical explanation ceases and supernatural apparitions replace it is different in the two cases; but the scientific method is the same. To the Australian black, *e.g.*, the spark of the Leyden jar is probably devil-devil, while Hartmann can explain it naturally; but the method of transition from the one principle to the other is entirely the same. The leaf that turns to the sun is for Hartmann what the Leyden jar is for the Australian black. While the indefatigableness of inquirers in this very department is daily making new discoveries, all pointing to mechanical causes of these phenomena, the Philosopher of the Unconscious has here stopped his botanical studies at a point, as it happens, which leaves the whole mystery untouched,

[84] Waitz, Anthropol. der Naturvölker, fortges. v. Gerland, vi. Th., Leipz. 1872, S. 797; comp. Oscar Schmidt, Doctrine of Descent and Darwinism, 1873, E.T. 1875, p. 301. —The aborigines of Australia refer everything which they cannot explain to the devil-devil; "manifestly only a name, derived from the English devil, for a deity of whom they have not preserved any distinct conception." With justice Schmidt condemns the shallowness of this evidence for the hypothesis of earlier better developed, but now forgotten, religious ideas. The reference of all that is inexplicable to devil-devil is obviously rather the rudiment of a philosophy which has no need of individual deities. Devil-devil is to the Australian black probably omniscient, omnipotent, and so on, without therefore being a person; exactly like the "Unconscious."

and here too, of course, is the limit where the fantastic reflex of one's own ignorance, the "intellectual cause," comes in and explains without further trouble what is still inexplicable.[85]

That Hartmann's intellectual causes are identical with the devil-devil of the Australian black scarcely needs proof. Science knows only one kind of mind, that is, human; and where we speak of 'intellectual causes' in a scientific sense, it is always understood that these manifest themselves through human bodies. Any other kind of 'mind' we may assume is transcendental and belongs to the sphere of ideas. If we have forced our way through Materialism to Idealism, we are entitled to declare everything existing to be intellectual in its nature so far as it is primarily our conception; but so long as we still distinguish between mind and matter, we have not the right to invent minds and intellectual causes which are not given to us.

[85] It is not uninteresting to compare the wholly unscientific way in which Hartmann discusses 'Instinct' in the vegetable kingdom with the latest scientific inquiries into the phenomena here in question of the growth of plants, heliotropism, opening and shutting of flowers, curling of tendrils, &c. The uncommonly instructive discoveries of Sachs, Hofmeister, Pfeffer, Frank, Batalin, Famintzin, Prillieux, and others, have, without exception, been reached through the presupposition of a strictly mechanical basis of these facts in the vegetable life, and this presupposition has in many cases been already brilliantly confirmed. We mention only briefly that heliotropism has been referred to retardation of growth by light, and consequent concave curvature; that the embracing of objects by tendrils rests upon an also experimentally demonstrable irritability of the more weakly growing side; that the day and night position of the leaves of Oxalis rests upon an effect of light on particular points of inclination, and that the plant (despite the omniscience of the Unconscious) allows itself to be deceived if we allow a special light to fall exclusively on these points of inclination, &c. Compare with this the observation of Knight, who grew plants on the radial side of a rapidly revolving wheel, and found that the chief roots grew in the direction of the centrifugal force; further, the experiments of Sachs on the influence of moisture in the soil on the direction of the roots. (Comp. Sachs, Grundz. d. Pflanzenphysiol., Leipz. 1873; Hofmeister, Allg. Morphol. d. Gewächse, Leipz. 1868; Pfeffer, Physiol. Unters., Leipz. 1873; Naturf. 1871, No. 49; Botan. Z. 1871, No. 11 and 12; Naturf. 1872, No. 4, &c.) What would have become of all these valuable investigations if the respective inquirers had referred the phenomena to the teleological interference of the 'unconscious' or of any other phantom?

As concerns the human mind, we will for the time assume that the view may be defended which makes mechanical work disappear in the brain and transform itself into 'mind,' as well as conversely makes a definite amount of work arise from the mind. That we do not share this view, but rather adopt an uninterrupted causal series of material phenomena, has already been sufficiently shown; yet let us here assume the contrary, that we may at least reach an example of 'intellectual causes' producing material phenomena. It can now be the less admissible to generalise this hypothetical cause, as all analogy is wanting between the phenomena in nature and those in man. We may well recall here Du Bois-Reymond's challenge—that if he is to accept a world-soul, its brain should first be shown him somewhere in the universe. Why does this challenge seem so strange? Simply because with regard to those things in nature in which an anthropomorphic conception most easily suggests itself, we are not at all accustomed to think of the brain, or of the molecular movements within it. It is rather human hands that we make the hands of God; it is the vital manifestations of imaginary beings which interfere with the course of things on the analogy of human actions, not of human brain-movements. The believer sees in the series of events "the hand of God," not a molecular movement in the brain of the world-soul. Savage peoples imagine ghostly beings of superhuman-human kind everywhere present. From these ideas, and not from the theory of the brain, have proceeded all the notions of immaterial causes; and the whole hypothesis of an "intellectual sphere" of the effects which we observe is nothing but a notion borrowed from these varied creations of faith and superstition. Science knows no such "intellectual sphere," and can therefore borrow no causes from it. What she cannot explain naturally on the principles of the mechanical cosmology she simply does not explain at all. It remains for the present an unsolved problem.

But the charcoal-burner's creed and false philosophy have at all times agreed in explaining the inexplicable by means of words, behind which there is nothing but the more crudely or more subtly conceived sphere of phantoms, which is but the fantastic reflex of our ignorance.

Upon these principles rests now the possibility of a very interesting calculus of probabilities. To establish it we need a complete disjunction. If under "intellectual causes" we were to imagine something definite, such as actions of a human or anthropomorphically conceived divine being, the disjunction would not be safe. There might very well be causes of a third kind as, *e.g.*, enchantment, planetary influences, spiritualism, &c., all of which from this standpoint would deserve serious consideration. But so soon as we understand by "intellectual" simply everything that at present cannot be shown to be material, the disjunction is complete. Any as yet undiscovered material causes fall away, and all that remains is devil-devil.

Now it can be shown that the probability that devil-devil is in play is in all natural phenomena equal to certainty. Hartmann does not apply it to all natural phenomena, but only to that portion of them which belongs to the philosophy of the unconscious. The method, however, is just as simple as its universal applicability is evident. We call the probability that M has a material cause $\frac{1}{x}$, then the probability of an "intellectual" cause is $1 - \frac{1}{x}$. If, now, we cannot find the material causes, $\frac{1}{x}$ becomes infinitely small, and the converse becomes a certainty which is expressed by 1.

The thing takes a still more beautiful shape if we consider one particular natural phenomenon. Here, namely, we have the advantage that we can resolve every such phenomenon into a series of various partial phenomena,

which all, as is fitting, admit a doubt whether they too have a purely physical foundation. Then, relying upon a well-known elementary principle in the calculus of probabilities, we may be bold without danger. We may place the probability that the partial phenomena, taken singly, come about from material causes pretty high; since the probability of their coincidence will still be very slight, as it is the product of the separate probabilities. If, for instance, we have 15 partial phenomena, let us put the probability of a physical cause = 0.9. The man of science will indeed be inclined to put it at once = 1; but that is only because he takes into account also the as yet unobserved natural causes, and because he has drawn from the previous course of natural research the inductive conclusion that when inquiry has been carried far enough everything will finally be explained from the ordinary laws of nature. With such a presupposition the artifice of the philosophy of the unconscious is no longer possible. But if we stick to the probability 0.9, the probability for the continued phenomenon on the above assumption will be the fifteenth power of this, and that is a very small fraction against which the contradictory opposite, the 'intellectual cause,' stands in the *éclat* of a very considerable probability.

In like manner it may be shown that a man cannot win at dice ten times in succession without the help of Fortuna or of a *spiritus familiaris*. Il n'y a que le premier pas qui coûte. Let us assert with simple confidence the disjunction that in each stroke of luck Fortuna either co-operates or does not. Let us put the probability of winning without the aid of Fortuna in the individual case = $\frac{1}{2}$, and we immediately have the tenth power of this fraction for the probability of a tenfold repetition of the success. The co-operation of Fortuna now comes close to certainty.

Any one who knows the calculus of probabilities somewhat more thoroughly knows that the probability of any

particular series of equally possible events is in itself equally great; that, therefore, the case, *e.g.*, in which our player wins in the 1st cast, loses in the 2nd, 3rd, and 4th, wins again in the 5th and 6th, loses in the 7th, wins in the 8th and 9th, loses again in the 10th, is every whit as improbable as the case of his winning ten times in succession.[86] The reality itself, where it depends upon many individual circumstances, or where it is a particular case among many possibilities, appears always, regarded *a priori*, as extremely improbable, which, however, does not affect its reality. The simple explanation is, that the entire doctrine of probability is an abstraction from the efficient causes which we happen not to know, while cer-

[86] Comp. on this the lucid discussions of Laplace, Essai Philosophique sur les Probabilités, 6e Principe.

When the editor of the German translation (Langsdorf, Heidelberg, 1819) makes an objection at this very point and (S. 20 *n.*) blames the division of possible cases into ordinary and extraordinary, because the latter are identical with the less probable, he has simply failed to understand the force of this very subtle psychological observation. The object is to show that amongst certain equally improbable (and, quite abstractly considered, also equally 'extraordinary') cases we immediately recognise and appreciate some in their entire 'extraordinariness,' *e.g.*, as a case which only occurs once in millions of times, while others lose themselves psychologically in a long series of similar cases, and, therefore, produce the impression of ordinariness, although their probability is just as little as that of the former cases. Thus it is with the example given in the text of a player who wins on one occasion ten times in succession, on another wins and loses by turn in a definitely determined order.

Laplace, moreover, brings this distinction into connexion with the inference backwards from a phenomenon to its causes, and this is, be it said in passing, the point in the calculus of probability from which Hartmann should have started in his investigation, instead of keeping in a clumsy and obviously perverse way to Laplace's third principle, from which here no result whatever can follow but that complicated cases are in fact complicated cases. In the cases under the sixth principle, however, the remarkable or extraordinary cases are always those which in a measure have the type of human purposefulness about them, even though it is only in a certain purely external symmetry; as, *e.g.*, if amongst a million numbers the figures 666666 should appear. Here, that is, we overlook at a glance the entire relation of numerator and denominator in the fraction of probability, and are at the same time reminded of the possibility that some one has put these figures together *intentionally*. And this latter impression is specially overpowering when the particular result has a peculiar significance. Thus, *e.g.*, if the letters EUROPA appear exactly in this order,

tain general conditions are known to us on which we base our calculation. When the dice has received its impulse and is hovering in the air, it is already determined by the laws of mechanics which side will ultimately remain uppermost, while for our judgment *a priori* the probability in favour of this side as for every other is $\frac{1}{6}$.

If there are a million balls in an urn and I put my hand in to withdraw one, the probability for any particular ball is only a millionth, and yet one, and that a particular one, must of necessity be drawn. The fraction of probability here means nothing more than the degree of our subjective ignorance as to what will happen, and

which is at the same time not in the least more improbable than any other meaningless combination. But the numerator of the fraction of probability here is = 1, and the denominator = the number of the possible combinations of these six letters, and incomparably greater, if we suppose that they were drawn blindly from a compositor's case. Here again we must first of all observe that the reality of such chances, and, therefore, also their general possibility, can by no means be affected by the calculus of probabilities. This is the point which Diderot had already remarked in the 21st chapter of the 'Pensées Philosophiques,' when he shows that the origin of the 'Iliad,' or of the 'Henriade,' by a mere fortuitous combination of letters, is not only not impossible, but is, in fact, very probable, so soon as we can increase the number of experiments to infinity. In reality, however, we compare in these cases the extraordinarily small probability of fortuitous formation with the incomparably greater probability of voluntary formation. Here, now, in fact, the temptation is very great to assume with Hartmann a phantom for all those who believe in phantoms. Nay, even the acute mathematician Poisson says, in treating this point in sect. 41 of his 'Théorie du Calcul des Probabilités:' "If we have observed a fact, which in and for itself had very slight probability, and it presents something symmetrical or remarkable, we are quite naturally led to the idea that it is not the effect of chance, or, more generally, of a cause which would give it this slight probability, but that it arises from a mightier cause, as, *e.g.*, the will of a being which had a definite purpose therein." Here the thing is treated with such mathematical generality that the very natural fallacy of the savage who believes in a phantom and the correct conclusion of the scientifically trained mind are embraced by the same expression. The latter, however, despite all allurements, will not, on analogy, bring into calculation any such 'beings' as are not given him, and given him are only man and the higher animals as acting towards ends. He may indeed carry his reflections beyond this as to a purposeful disposition of the universe, but no single case of a combination, however *a priori* wonderful, will induce him to assume the mystic interferences of a 'being' of which he has no conception.

it is just the same in the instances which Hartmann borrows from organic nature. That, *e.g.*, among the natural causes of sight certain nerve-cords, which are sensitive to light, proceed from the brain and spread over the retina, is a fact, the conditions of which again are so complicated and still so unknown to us, that it would be ludicrous to speak here of a 'probability' = 0.9, or even 0.25. The probability that this happens accidentally is rather equal to nil, and yet the fact is real, and, as every thinking student of nature will assume, also necessary by the universal laws of nature. Here because of the 'improbability,' which is, after all, only the mathematical expression of our subjective ignorance, to embrace a principle which lies beyond natural research is simply to abandon science and to sacrifice sound method to a phantom.

A closer examination of the 'Philosophy of the Unconscious' is no part of our plan. The way from the point where we leave it to false teleology through the interference of the 'unconscious' is obvious, and we have only to do with the foundations of the new metaphysical edifice. That in our view the value of metaphysical systems does not depend upon their demonstrative foundation, which rests entirely upon illusion, we have already sufficiently shown. If the 'Philosophy of the Unconscious' should ever gain so much influence upon the art and literature of our time and thus become the expression of the predominant intellectual tendency, as was once the case with Schelling and Hegel, it would, despite its mischievous foundation, be legitimatised as a national philosophy of the first rank. The period which should be marked by it would be a period of intellectual decay; but even decay has its great philosophers, as Plotinos at the close of the Greek philosophy. In any case, however, it remains a remarkable fact that so soon after the campaign of our Materialists against the whole of philosophy, a system could find so much acceptance, which opposes itself more

decidedly to the positive sciences than any of the earlier systems,[87] and which in this respect repeats all the errors of Schelling and Hegel in a much coarser and more palpable shape.

[87] It will hardly be necessary for our readers once more to disturb the illusion that the 'Philosophie des Unbewussten' contains "speculative results on the inductive scientific method." There can hardly be another modern book in which the scientific material swept together stands in such flagrant contrast to all the essential principles of scientific method.

THIRD SECTION.

THE NATURAL SCIENCES

Continued.

MAN AND THE SOUL.

THIRD SECTION.

THE NATURAL SCIENCES

Continued.

MAN AND THE SOUL.

CHAPTER I.

THE RELATION OF MAN TO THE ANIMAL WORLD.

THROUGH the whole History of Materialism runs this marked feature that cosmical questions gradually lose in interest, while anthropological questions excite an increasing eagerness of controversy. It may, indeed, appear that this anthropological aspect of Materialism reached its highest point in the last century; for the magnificent discoveries of modern times in the fields of chemistry, physics, geology, and astronomy have brought forward a series of questions upon which Materialism had to take up a distinct attitude. This might, however, happen without any need for essentially new principles or startling and strife-provoking views. On the other hand, anthropology, too, has made the most astonishing progress; partly, it is true, in departments which have little to do with the problem of Materialism. We have got rid of the phantoms of disease, have begun to shake a little medical ecclesiasticism, and by means of comparative and experimental physiology have reached surprising results

as to the functions of the most important internal organs. In those departments, however, which stand most closely related to the questions of Materialism, recent discoveries have shown the inadequacy of earlier conceptions, without substituting a new theory upon which Materialism might securely rest itself. The nervous system in its activity is no longer such a mystery to us as it was—or, indeed, must have been—for the Materialists of last century. The brain was in some respects better understood than before; it was with gigantic industry anatomised, measured, weighed, analysed, microscopically examined, studied in morbid conditions, compared with the brain of animals, and in animals submitted to experiment; but as to the physiological connexion and the mode of action of its parts, we have never succeeded in propounding a comprehensive hypothesis; there is all the more idle talk, and in this, of course, the Materialists are not behindhand. A department which offered them a better opportunity is that of molecular change, as indeed generally the application of physics and chemistry to the functions of the living organism. Here, indeed, many of the results of professedly exact research still call for a severely winnowing criticism: yet, on the whole, we may consider successful the attempt to exhibit the living man, as he is externally given us, like all organic and inorganic bodies, as a product of the forces operating throughout nature. An extremely important department, the physiology of the sense-organs, has, on the other hand, produced decisive grounds for the refutation of Materialism; but it has, as yet, been little drawn into the debate, because the opponents of Materialism partly cannot employ this kind of refutation for their purposes, but partly because they do not possess the requisite knowledge. Meanwhile the attempt has also been made to submit psychology to a scientific, and even a mathematical and mechanical mode of treatment. In psycho-physics and moral statistics sciences have been established which appear to lend sup-

port to this effort. Since the Materialistic controversy has recently been often described precisely as a battle for the soul, we shall have in the course of this section to consider all these departments.

First of all, however, we must deal with the question of the origin and age of mankind, and the relation of man to the animal world, a question which at the time of the controversy excited by Büchner and Vogt was most eagerly discussed, but which since then, through the remarkable energy of research in all those concerned, has been in some measure rescued from the caprice of subjective opinions and hazardous hypotheses. This question is generally treated in intimate connexion with Darwin's theory of the origin of organisms, almost, in fact, as its most interesting point, and, strictly speaking, as its highest result. So much now is clear, that the strictly scientific interest of the theory of descent coincides with the carrying out of the general principle for the origin of organisms. That man is part of the great chain of this origin is, from a scientific standpoint, quite obvious; but so far as the rise of human civilisation and intellectual life requires a special explanation, it is quite natural that investigations on this point are completed even in special sciences in the closest connexion with the entire sphere of anthropological questions. And so even the history of the world is treated meanwhile as no part of natural history, however clearly we may trace that the principles of the struggle for existence here too play their part.

The dualism of mind and nature may be critically resolved or speculatively "surmounted;" we may, from the standpoint of natural science, assert as an axiom that ultimately the intellectual life also must be capable of being understood as a product of the general laws of nature; but we cannot prevent a distinction being made between nature and mind so long as we have different starting-points for the knowledge of the two spheres and different standards for the appreciation of their

phenomena. That man only raised himself from an animal pre-existence by internal development, and so first became man, was treated by Kant as obvious; but he regarded the appearance of the idea of the 'ego' as the true moment of the creation of man.[1] So that even now the main problem will always remain that of the primitive history of the mind and of civilisation, since the proceeding of man from the animal world is scientifically obvious, while, on the contrary, his intellectual life still remains a problem, even though all the consequences of the theory of descent are conceded. At the same time, to make the true philosophical view intelligible to wider circles, it will be necessary to explain and clear the way by some preliminary discussion, especially in the sphere of geology and palæontology.

[1] Comp., *inter alia*, the following passages:—Anthropol., § 1: "That man can conceive the Ego, raises him infinitely above all other creatures living on the earth. Through this he is a *person*, and by virtue of the unity of consciousness in all the changes which may affect him, one and the same person, *i.e.*, a being entirely distinct in rank and dignity from *things*, such as are the irrational animals which we can dispose of as we will." Further, the 'note' to the essay Muthmasslicher Anfang d. Menschengesch. (1786), Hart. iv. 321: "From this account of early human history, it results that man's departure from the paradise which reason represents as the first abode of his kind was nothing else but the transition from the savagery of a merely animal creature to humanity, from the go-cart of instinct to the guidance of reason; in a word, from the guardianship of nature into the condition of freedom." In the review of Moscati's treatise (1771), Hart. ii. 429 ff., Kant admits the grounds assigned by the Italian anatomist for the original four-footed state of man. The concluding words are: "We see from this that the first care of nature was that man, as an animal, should be preserved for himself and his kind, and for this end the attitude which is most suitable for his internal structure, the position of the embryo, and its preservation in danger, was the four-footed; but that a germ of reason was implanted in him, by which, when it is developed, he is intended for the social state, and by means of which he adopts for good the attitude most adapted to this, viz., the two-footed, through which he gains, on the one hand, an infinite advantage over the animals, but must also put up with the inconveniences arising from his thus so proudly raising his head above his old comrades." Not quite so decided as to the four-footed gait is the passage in the Anthropol. II. E., Hart. vii. 647, where Kant discusses the "technische Anlage" of man derived from the animal state, and finally raises the question again: "Whether he is by nature a social or a solitary and neighbour-shunning animal, of which the latter is the most probable alternative."

The dogmas of the terrestrial revolutions, of the successive appearance of the creatures, of the late appearance of man, were from the first opposed to Materialism and still more to Pantheism. While Buffon, De la Mettrie, and later the German Philosophers of Nature, with Goethe at their head, eagerly embraced the idea of the unity of creation, and attempted to develop throughout the higher from the lower forms, it was notably Cuvier, who, as the most profound master of details, came forward to oppose these unitary tendencies. He was afraid of Pantheism. Goethe most completely represented this very Pantheistic and unitary philosophy; still earlier he had had differences with Camper and Blumenbach as to the Wormian bones, which were supposed to distinguish the ape from man, and until his death he followed the controversies as to the unity of all organisms with the greatest attention. Thus he informs us of a malicious utterance of Cuvier's: "I know well that for certain minds behind this theory of analogies there may lurk, at least confusedly, another very old theory, which, long ago refuted, has been sought out again by some Germans in order to favour the Pantheistic theory which they call the Philosophy of Nature."[2]

This pride of positive knowledge, as compared with a comprehensive survey of the whole, the zeal of the observer who distinguishes as compared with the comprehensive thinkers, made Cuvier blind to the great logical difference between the absence of proof and the proof of absence of a phenomenon. No fossil men were known, and he delivered the axiom that there cannot be any.

Such an expression must strike us the more, as a negative proposition in natural history generally has only a subordinate value. Considering the extremely small portion of the earth's surface which had then been examined, it would have been very puzzling to explain how so

[2] Goethe in his 'Zur Natur-Wissenschaft im Allgemeinen;' Principes de Philosophie-Zoologique, par Geoffroy de St. Hilaire, towards the end of the first section.

general a statement could be justified, if its connexion with the favourite theory of successive creation did not afford an explanation. But successive creation was a sort of modification of the biblical doctrine of the creative days, which even now, when the facts render it quite untenable, finds many followers. Vogt, in his lively polemic, contrasts the theory of those days and the discoveries of the present so pregnantly and comprehensively, that we cannot refrain from introducing his picture, despite some superfluous pleasantries:—

"It is scarcely thirty years since Cuvier said, There is no fossil ape and cannot be any; and to-day we speak of fossil apes as of old acquaintances, and bring fossil man not only amongst diluvial forms, but even into the latest tertiary formations, though some obstinate people may maintain that Cuvier's assertion is an utterance of genius and cannot be overturned. It is hardly twenty years since I learned from Agassiz: transitional strata, palæozoic formations—kingdom of fishes; there are no reptiles in this period, and cannot be any, because it would be contrary to the plan of creation; secondary formations (Trias, Jura, chalk)—kingdom of reptiles; there are no mammals, and cannot be any, for the same reason; tertiary strata—kingdom of mammals; there are no men, and cannot be any; present creation — kingdom of man. What is become of this plan of creation with its exclusivenesses? Reptiles in the Devonian strata, reptiles in the coal, reptiles in the Dyas—farewell, kingdom of fish! Mammals in the Jura, mammals in Purbeck chalk, which some reckon as the lowest chalk formation—goodbye, kingdom of reptiles! Men in the highest tertiary strata, men in the diluvial forms—*au revoir*, kingdom of mammals!"[3]

It is remarkable that in the very next year after Cuvier's and Goethe's death a discovery was made known which would have alone sufficed to upset the theory of the former, if the plague of authority and blind prejudice were

[3] Vorlesungen über den Menschen: Giessen, 1863, ii. 269.

not much commoner than simple receptivity of facts. This was the discovery of Dr. Schmerling in the bone-caves of Engis and Engihoul, near Liège. Some years later Boucher de Perthes began his restless researches for human remains in the diluvial formations, which were only rewarded after long pursuit by the discoveries in the valley of the Somme. These results were only recognised at last after a long controversy, and from that time the opinion of science gradually changed. A new series of extremely interesting discoveries at Aurignac, Lherm, and in Neanderthal on the Düssel, coincided in time with the gradual victory of Lyell's view of the formation of the earth's crust, and with Darwin's new doctrine of the origin of species. With the changed views of specialists many earlier notices were brought forward and combined with the recent discoveries. The joint result was, that, in fact, human remains were extant, the structure and position of which proved that our race existed together with those earlier species of the bear, the hyena, and other mammals, which are named after the caves where their remains are generally found.

As to the age, however, to be assigned to these remains, such varying and discrepant suppositions have been made, that we can gather nothing from them but the great uncertainty of all modes of calculation yet tried. Ten years ago the general tendency was to the assumption of periods running to hundreds of thousands of years; but at present a strong reaction has set in, although not only has the material for diluvial man considerably increased, but traces have been obtained of the existence of our race in the tertiary period.[4]

[4] Vierteljahrs-Rev. d. Fortschr. d. Naturw. hg. von d. Red. der Gäa (Dr. H. Klein), I. Bd. 1873, S. 77 f. "Even though the bones of the Elephas meridionalis, found by Desnoyers in the tertiary sand of the Somme valley, with obvious marks, can claim only a doubtful importance, since Lyell has shown conclusively that similar marks, due to rodent animals, are produced in the deposits of that district, yet the marks demonstrated by Delaunay on two ribs of the Halitherium, an extinct sea-cow of the later tertiary formation, cannot be referred to a

In the cave of Cro-Magnon[5] were found (in 1868) human remains of five different individuals, together with the bones of a great bear, of the reindeer, and other animals of the diluvial epoch. The peculiarities of these human skeletons pointed to a race of athletic force, savage wildness, but at the same time of highly developed brain. In some deeper strata of the same cave were found stone implements and other traces of human activity, which must partly have belonged to a considerably older race. At Hohlenfels, not far from Blaubergen,[6] Professor Fraas discovered (in 1870) an ancient abode of men who hunted and devoured three different kinds of bears, amongst them the cave-bear. In the same cave are found numerous remains of the reindeer, whose horns were manufactured by flint knives into tools. Even a lion, which in size must have greatly surpassed our present African lion, had fallen before the rude weapons of these cave-dwellers. Rhinoceroses and elephants were amongst their contemporaries.

The very discoverer, however, of these memorials of the past is one of the chief advocates of short periods of time. With great sagacity Fraas is still seeking everywhere in ancient and medieval traditions for a shadowy recollection of the social condition of this cave-epoch and the relations with the then existing animals. In fact, the notion of separate periods of thousands of years for the mammoth, the cave-bear, the reindeer, appears untenable.

later period, but obviously date from a time when the bones were not yet petrified. Abbé Bourgeois found near Pont-Leroy beneath the marly chalk of Beauce a layer of pebbles which had been undoubtedly worked by human hands (cit. Mort. Materiaux, 2 Ser. v. 297). It is well known how difficult it sometimes is to decide whether we are dealing with natural or artificial products. In the case before us, however, Lartet, Mortillet, Worsae, and other experienced inquirers, are unanimously of opinion that the flint-stones of Thenay, near Pont-Leroy, have been worked by human hands, and that they come from an undisturbed position belonging to the middle tertiary period."

Comp. *l. c.*, S. 81, on Tardy's remarkable find, "who discovered near Aurillac, together with fossil remains of the Dinotherium, a rudely hewn stone knife, which must have been made in the meiocene period."

[5] Vierteljahrs-Rev., i. 99 ff.

[6] *L. c.*, i. 102 ff.

All these creatures have lived together in Central Europe, though one race may have disappeared earlier than another. The preservation or destruction of their bones seems to be almost solely determined by the degree of moisture of their situs, and their state affords no indication of their age. If Fraas, through his peculiar combination of geological criticism and mythological or etymological tradition, comes down to periods which are within the limits of the 6000 years of the biblical cosmogony, nothing is to be said against it so far as his arguments are good. The entire independence of natural science from this tradition must show itself not merely in admitting in astronomical and geological theories whatever periods of time we may require, but also in our contenting ourselves, without regard to the smile of triumph in the enemies of free science, with periods of a few thousand years, if the facts point to them. Free inquiry no more suffers a real injury in this way than Christian faith on its inner side receives a support which is indispensable for its continuance. At the same time, we must here again recall to mind that it is logically quite inadmissible to treat large numbers as in themselves improbable, while in doubtful cases, as a rule, the greater number has the greater probability on its side. The proof must be alleged for the minimum, and from any such proof the considertions which Fraas has adduced from tradition in language and story are still far removed.

The decisive word in this question must in all probability be spoken by astronomy. Already the traces of the glacial epoch are brought in two different ways into connexion with astronomical facts: first, with the periodical variation in the obliquity of the ecliptic, and, next, with the changes in the eccentricity of the earth's orbit. While the latter explanation removes the ice-age, at least 200,000, if not 800,000 years, from the present, the former brings us to a period of only 21,000 years, within which now the northern and then the southern hemisphere of the

earth would have its ice-age.[7] Here, then, the different views must in time be brought to an inexpugnable decision whether these changes could or could not exercise so profound an influence upon the climatic conditions of the earth. Should the result be a negative one, there would then remain only the terrestrial changes in the height of the continents and of the sea, the course of cold and warm sea-currents, &c., to serve as explanation, when, of course, our expectation of an exact chronology of these changes would become very faint. Moreover, we must observe that not only might the two astronomical causes of an ice-age exist together, but also that a co-operation of these with terrestrial changes is to be seriously considered. Let us assume, *e.g.*, that the northern hemisphere had a maximum of cold some 11,000 years ago, then in the period of transition from that state of things to the present age, especially during the period from about 8000 to about 4000 years ago, under the influence of terrestrial causes the ice-age may have disappeared several times and returned again, until at length the increasing heat drew firmer limits for the glaciers.

On this view, even the traces of the presence of man, which reach back to the tertiary age, would be no proof for an existence of our race to be reckoned by hundreds of thousands of years.

What, then, regarded in the light of science, is the meaning of the 'antiquity of the human race?' Since man, like all other organisms, draws his physical origin from the first development of organic life upon the earth,

[7] Comp. Lubbock, Pre-historic Times. See p. 413 ff. for the theory of Adhémar, according to which the northern and southern hemispheres *receive* indeed the same amount of heat from the sun, but do not *retain* the same amount, because of the greater number of night (and therefore radiating) hours in the southern hemisphere. This difference once conceded, the change in the condition of both hemispheres results in the known period of some 21,000 years.

On the climatic effects of the changes in the eccentricity of the earth's orbit, see *l. c.* p. 420 a table which goes back a million years, and in which two periods of maximum cold appear, of which the one (preferred by Lyell) must have occurred some 800,000 years, the other, on the contrary, only some 200,000 years ago.

the question can only be this: at what period are creatures first found which are like us in their organisation, so that from that period no essential development of the external form and organisation has taken place? With this question connects itself, on the one hand, that of the transitional forms and early stages of humanity, on the other, the question of the beginnings of human civilisation.

The transitional forms we have to seek in all probability not on the soil of modern Europe, which man seems to have trodden only as an immigrant after attaining his complete organisation. "The great break in the organic chain between man and his nearest allies, which cannot be bridged over by any extinct or living species, has often been advanced as a grave objection to the belief that man is descended from some lower form; but this objection will not appear of much weight to those who, from general reasons, believe in the general principle of evolution. Breaks often occur in all parts of the series, some being wide, sharp, and defined, others less so in various degrees; as between the ourang and its nearest allies—between the Tarsius and the other Lemuridæ—between the elephant, and, in a more striking manner, between the Ornithorhynchus or Echidna, and all other mammals. But these breaks depend merely on the number of related forms which have become extinct. At some future period, not very distant as measured by centuries, the civilised races of man will almost certainly exterminate and replace the savage races throughout the world. At the same time the anthropomorphous apes, as Professor Schaaffhausen has remarked, will no doubt be exterminated. The break between man and his nearest allies will then be wider, for it will intervene between man in a more civilised state, as we may hope, even than the Caucasian, and some ape as low as a baboon, instead of, as now, between the negro or Australian and the gorilla."[8]

[8] Darwin, Descent of Man, 2d. ed., p. 156.

All the more light have we very recently obtained with regard to the social condition of these primitive inhabitants of Europe; indeed, it appears that we have found a pretty certain clew reaching from diluvial man down to the historical period. It is principally the tools, the products, and means of his art-industry which afford testimony as to the mode of life of man in the different periods of the progress of civilisation. In the cave of Lherm were found human remains mingled with bones and teeth of the cave-bear and the cave-hyena beneath a thick layer of stalagmites. "Besides man's remains were found evidences of his industry, a triangular flint stone knife, a cylindrical bone of the cave-bear which has been converted into a cutting instrument, three under-jaws of the cave-bear, the ascending branch of which was bored with a hole to hang it by, and the eye-troching of a stag's horn, which was cut and pointed at its base. But the most notable weapons consist of twenty half-jaws of the cave-bear, on which the ascending branch was broken away, and the body of the under-jaw so far cut as to form a convenient handle. The markedly projecting canine tooth formed in this way a spike, which might serve equally as a weapon or as a hoe to turn up the soil. Had we found only one of these remarkable instruments," say the authors (of a report published at Toulouse, MM. Rames, Garrigou, and Filhol), "it might be objected that it owed its origin to chance, but when we find twenty jaws, all of which were worked in the same manner, is it any longer possible to talk of chance? Moreover, we can follow the work by means of which the primitive man gave this form to the jawbone. We can count on each of these twenty jawbones the blows and saw-marks which were made by the edge of a badly sharpened flint-knife."[9] The stone in-

[9] Quite a similar tool Professor Fraas found at Hohlenfels "from the under-jaw" (of a bear); "its condylus and its processus coronoideus were struck off in order to make the thing handy, and so a tool was produced which, with the sharp canine tooth at its extremity, had to perform the function of a butcher's hatchet. The finding of a single

struments have also been found in great quantities in the valley of the Somme, and Boucher de Perthes has not a little hindered the recognition of his discoveries by his attempt to give a too artificial significance to many specimens. The chalk of that district is rich in flint nodules, which need only be struck one against another till one breaks, in order to obtain pieces amongst the fragments which, after a little further treatment, give us the hatchets and knives of diluvial man. As now the ape sometimes makes use of a stone as a hammer, it might appear that we were here surprising man at a stage still bordering quite closely on the development of the animal. Yet the distinction is enormous, for the mere perseverance which is bestowed on the preparation of an instrument that is but a slight advance on the performances of a natural stone or fragment of stone, shows a capacity of abstraction from the immediate necessities and enjoyments of life, and of turning the attention entirely upon the means to the attainment of an end, which we shall not easily find among the mammals and even among the apes. Animals sometimes build themselves highly artificial homes, but we have not yet seen that they use artificial tools also in their construction. Political economy, it is well known, tries to trace the nature of the accumulation of capital to the construction of the first tool. Well, this beginning of human development was at least present in the diluvial man. Our present ourang or chimpanzee would, economically considered, be a clod compared with him, a mere vagabond. If we assume a development of mankind

lower jaw thus prepared would, of course, be unimportant; but so soon as a large number of specimens treated in exactly the same way was found, the intentional working into this form was recognised." "After most careful examination of all the blows visible on the bones of the bears, I was completely convinced that it was usual with this people to hew out the bones of their prey from the flesh with the jaw of the bear." "I have tried striking fresh bones with the thousand-year-old bear's jaw, and have, *e.g.*, in fresh, hard deer-bones, with great care produced just the same holes that we observe on the bear-bones" (Arch. f. Anthrop., v. 2, S. 184, cit. Viertelj.-Rev., i. S. 104 ff.).

through endless stages from the most invisible organic forms to the present epoch, then certainly not the smallest period elapsed from the time when man with a vigorous organisation exercised well-formed hands and strong arms to the moment when he assisted these organs by painfully elaborated flint-knives and the jawbones of bears.

Beside these rude instruments we find, however, also unequivocal traces of fire. Even in the earliest times the primitive dwellers in Europe seem to have known and used this most important of all human auxiliaries.[10] "The animal," says Vogt, "rejoices in the fire that has accidentally arisen and warms itself at it; man tries to keep it in, to produce it, and to make it serve various purposes." In fact, a Knight of the Absolute Distinction between Man and Animal could find no prettier principle in order to defend his standpoint in face of the latest discoveries. It is just this forethought, the care for later necessities, that has led man step by step to higher civilisation, and which accordingly we find characteristic of him in his so distant early history. Nevertheless, it is, on a calm consideration, obvious that we know nothing of any such absolute distinction, and do not find in the sphere of science the slightest occasion to assume it. We have neither any knowledge of the further capacity of development in the animal world,[11] nor of the stages

[10] Whether *all* the races of whose existence in very ancient times we find traces were acquainted with fire is indeed doubtful, as races have been found even in modern times that knew nothing of fire (cp. Lubbock, *l. c.* 453). In Europe, however, we find traces of fire not only in the oldest pile-dwellings and in the Danish shell-mounds known as 'Kjökkenmöddings,' but also in some caves, as *e.g.*, at Aurignac (cp. Lyell, Antiquity of Man, p. 181), where were found, besides coals and ashes, sandstones reddened by heat, which must have formed a hearth. At Pasly, Colland examined a diluvial stratum of very great antiquity, in which, besides remains of coal and ashes, very many traces of the mammoth, the cave-bear, the giant-stag, &c., occurred (Vierteljahrs-Rev., i. 94; cp. *l. c.* 99 f., on remains of coal in the cave of Cro-Magnon).

[11] Kant makes the remark in the Anthropolog. II. E., Hart. vii. 652, that no creature except modern man has the habit of entering upon life at birth with a cry. He believes that even in man this betraying and enemy-attracting cry cannot originally have occurred,—that it belongs

through which man had to pass until he came to keep up fire and make it serve his purposes.

With extreme sagacity the results of several discoveries of remains have been combined in order to draw conclusions here as to the remnants of a cannibal feast, there as to the ceremonies of interment. We pass by these interesting attempts in order to recall again briefly the conclusions as to the organisation of diluvial man which have been based upon the constitution of the bones discovered. Here it must unfortunately be reported that the material is sadly deficient. The find of Aurignac, perhaps the most interesting of all, has become a monument of the ignorance of a physician, who had seventeen diluvial skeletons of different ages and sizes interred in a churchyard, where afterwards, probably from fanaticism, no one could tell where they were buried. After eight years, all the persons concerned, together with the spectators, had forgotten the spot! Perhaps later it may be better recollected. As it is, we are only told that all the skeletons were of very low stature.[12] The skeleton of the Neanderthal may be inferred to be that of a man of middle stature and of extraordinarily powerful muscular development. The skull is the most ape-like of all that we know, and hence it might be inferred that the condition of this diluvial race was one of great barbarism. Besides this, we have, however, a skull from the cave of Engis near Liége, which is thoroughly well formed, and bears with it no indication of a lower stage of development. In the skeletons of Cro-Magnon, finally, there is a highly developed skull structure, combined with an unfavourable formation of the face, and

to the period of domestic life, without our knowing through what co-operating causes such a development has taken place. "This remark," continues Kant, "leads us far; *e.g.*, to the idea whether upon this same second period, by a great revolution of nature, there might not follow a third, when an ourang-outang or a chimpanzee might form the organs which serve for going, for handling objects, and for speaking, into the structure of a man, the innermost part of which should contain an organ for the use of the understanding, and should gradually develop itself by social culture."

[12] Lyell, Antiquity of Man, p. 183.

a development of the jaw which points to brutality, while the constitution of the skeleton testifies not only to a powerful development of muscular force, but also exhibits several ape-like features.[13]

We see from this, first, that there cannot be supposed to have been a single race of diluvial man, and then, further, that a very considerable brain development not only reaches back to the earliest times of which we have any knowledge, but that it is also compatible with a state of great rudeness and savage force. Whether in that case we must regard the Neanderthal skull as a pathological malformation or as the type of a specially low race, may here remain undetermined. We shall, at all events, have to suppose that even in that primitive age Europe was inhabited not by one but by several different races of man. None of these races, even in the earliest times of which we have traces, was in a condition standing very essentially behind that of the most uncultured savage of our time. Even though we regard the Neanderthal skull as the type of a race, we are not even then justified in removing this race to a stage which leads from the ape to man. Science may easily be overhasty in the case of such new and surprising phenomena, especially if they appear to be a brilliant confirmation of dominant ideas. With impatient haste we eagerly seize upon each new find, that we may employ it to complete that chain of development which the causality of our understanding demands. But this very haste is a remnant of mistrust in the understanding; just as though the game might suddenly be lost again in favour of dogmatism, unless positive proofs were at once got together for the agreement of Nature with a rational conception of things. The more completely we are freed from all dogmatic mists of every kind, the more thoroughly will this distrust disappear. For Epikuros it was still the most important point merely to show that all things might have arisen in some intelligible manner.

[13] Lubbock, Prehistoric Times, p. 346 ff. Viertelj.-Rev., i. S. 101 ff.

This principle of the intelligibility of all that is is sufficiently established for us; all the same whether it is derived from a sufficient experience or deduced *a priori*. Why then this haste? The same stamp of men that once swore most eagerly by Cuvier's dogma that there are no fossil men, now swear by the absence of the transitional stages: the everlasting effort to save by negative propositions the prejudice that cannot be established by positive propositions! Let us rest thereupon content with this, that even the diluvial age does not as yet lead us to a state of man essentially distinct from that of the Australian negro.[14]

[14] The question may be raised, What can have been the use of a fully developed human brain in so low a state of civilisation, or what can its use at present be to the Australian or the native of Tierra del Fuego? Wallace has used this idea to show that special conditions are probably required for the development of man as distinguished from the whole animal series. He maintains expressly that the large brain of the savage is much beyond the actual requirements of his condition; from which it would be quite unintelligible how such a brain could have been formed through the struggle for existence and by means of natural selection. (Cp. 'Contributions to the Theory of Natural Selection,' 1871, p. 339 ff.) But Wallace, on the one hand, puts the savage much too low compared with the beast, and, on the other, starts from an incorrect view of the nature of the brain. The large brain does not serve, as might have been once supposed, exclusively for the higher mental functions, but it is a co-ordinating apparatus for the most manifold movements. Let us only think what a number of centres of co-ordination and ways of connexion are required only by speech and the association of spoken sounds with the most diverse kinds of feeling! This complicated apparatus once given, the distinction between the highest rational functions of the philosopher or poet and the thought of the savage may rest upon very subtle distinctions, which partly can never be demonstrated in the brain, because they lie rather in function than in substance. (Cp. the chapter "Brain and Soul".) How otherwise —not to speak at all of savages and primitive man—could we explain the likeness in the most general features of the brain structure of a poor and uneducated countryman and of his talented and scientifically educated son? Moreover, it is very doubtful whether the great mass of men in our day exercise so much more complicated mental functions than the savages. Those who invent nothing, improve nothing, and, confined to their trade, swim with the great stream of imitators, understand only a small part of the manifold machinery of modern civilisation. The locomotive and the telegraph, the prediction of eclipses in the almanac, and the existence of great libraries with hundreds of thousands of books, are taken for granted by them, and do not trouble them any farther. Whether now, with the rigid division of labour, running ever into higher social positions, the functions of such a passive member of modern society are much higher than those of the

It is more satisfactory with regard to the transitional steps between diluvial man and historical times. Here a field has been gained in the last few years which, when zealously worked, promises us a complete early history of humanity. To it belong the much talked of 'Kjoddenmöddings,' primeval accumulations of emptied oyster and mussel shells, which have been found on the coasts of Denmark, accompanied by undoubted traces of human activity. To it belong especially, too, the pile-buildings of the Swiss and other European lakes; originally, no doubt, places of refuge and storehouses, later perhaps even marts for the commerce of the dwellers on the shores. These extremely remarkable structures were discovered in great numbers, and in rapid succession, after Dr. Keller made the first discovery in the winter of 1853–54, near Meilen, on the Lake of Zürich, and had recognised its importance. At present we distinguish in the objects, which are found in great numbers, especially where the pile-buildings bear traces of fire, three different ages, the

native of Australia may be very much doubted, especially as the latter are undervalued not only by Wallace, but generally in Europe. The 'Australische deutsche Zeitung' of Tamunda (reproduced in the 'Kölnische Zeit.') remarks, in noticing Petermann's last map of South-Eastern Australia, "The extraordinarily favourable climate of Australia spares what is perhaps the happiest of all wild races the labour of raising solid dwellings for shelter and protection; and the geographical conformations and the great variety and change in the scenery of the country do not permit him to establish fixed dwelling-places. The nature of the country compels him to a constant wandering life. Everywhere he is at home, and everywhere he finds his table spread, which, however, he has to fill with the most strenuous exertion and the utmost sagacity. He knows most exactly when and where these or those berries, fruits, or roots ripen in this neighbourhood, when the duck or the tortoise lays there, when this or that migratory bird settles here or there, when and where this or that caterpillar or chrysalis invites to a dainty feast, when and where the opossum is fattest, when this or that fish is here or there, where are the drinking springs of the kangaroo and emu, and so on. And just this life, thus forced upon him, becomes dear to him and a second nature, and makes him in a certain sense more intelligent than any other savage people. The children of these savages, when sent to school and well taught, are hardly inferior to European children, and in some branches even outstrip them. It is quite incorrect to conceive the Australian negroes as standing in the lowest grade of races. In a certain sense there is no more sagacious people than they are."

latest of which, the *iron*, reaches to the present time. The earlier ages are not, however, as in the ancient myth, the silvern and the golden, but carry us back to a time when the respective races possessed only implements of *bronze*, and finally to the *stone* age, the dawning of which we have already seen in the case of diluvial man.

But these periods also, as the progress of research has shown, have only a relative significance. Here there may have been peoples living in the state of the stone age, while at the same time elsewhere a high civilisation may have been developed. Stone tools, which had become familiar, and when good material and skilful workmanship enabled them for many purposes to do good service, may have long been retained in use, while side by side with them metals were employed; just as even to-day we find amongst savage tribes various implements of stone and shell, and that side by side with imported metal implements of European manufacture. We may therefore congratulate ourselves upon the plentiful results which the pile-buildings in particular afford us for the history of the earliest handicrafts, of the mode of life, and the gradually growing civilisation of prehistoric races. As to what it was that at first more rigidly distinguished man from the animals, and therefore as to the true beginnings of specifically human existence, we find here no result.

One fact, however, deserves to be pointed out, which seems, indeed, to be essentially connected with the first beginnings of what is specifically human—that is, the appearance of the sense of beauty and certain beginnings of art in times when man was obviously still living in savage conflict with the great beasts of prey, and was painfully maintaining an existence full of terror and vicissitudes of the most exciting kind. In this regard we must especially mention the outlines of animal figures on stones and bones, which were first discovered in the caves of Southern France, and recently also not far from Schaffhausen, near Thaingen. It may be added, that even in the

oldest and rudest remains of pottery we may almost always observe a certain regard to pleasantness of form, and that the elements of ornament appear to be nearly as old as any facility in the production of arms and utensils.[15] We have here a remarkable confirmation of the ideas which Schiller set forth in his 'Künstler;' for if we conceive the savage passions of the primeval man, we have hardly any source of educating and elevating ideas to oppose to them but society and the sense of beauty. We are thus involuntarily reminded of the well-known question whether man first sang or spoke. Here palæontology is silent, but instead we have anatomical and physiological considerations. According to Jäger's acute remark, the delicate management of the movements of the breath, especially the easy and free control of expiration, is a condition precedent of language, and this condition can only be completely fulfilled by the erect posture. This is true also of song, and therefore birds, which possess this freedom of the chest, are born singers, and at the same time learn to speak with comparative ease. Darwin is inclined to yield priority to song: "When we treat of sexual selection, we shall see that primeval man, or rather some early progenitor of man, probably first used his voice in producing true musical cadences, that is, in singing, as do some of the gibbon-apes at the present day; and we may conclude, from a widely spread analogy, that this power would have been especially exerted during the courtship of the sexes,—would have expressed various emotions, such as love, jealousy, triumph,

[15] A good compilation of the facts on this subject is to be found in Baer, Der vorgeschichtl. Mensch, S. 133 ff.; cp. also Naturf., 1874, No. 17, on the find of Thaingen (on the Schaffhausen-Constanz line), which contains on a reindeer's antler the drawing of a reindeer, that is said, "in delicacy and character of form and in detail of execution," to greatly surpass all yet known drawings from the caves of Southern France. The reporter (A. Heim, in the Mittheil. d. antiquar. Ges. in Zürich, xviii. 125) points out that these drawings of animals are always found in connexion only with unfinished flint implements; he supposes them to be considerably older than the oldest pile-dwellings of Switzerland, in which nothing of the kind is found. Here, therefore, an older race, in a much lower stage of civilisation, had attained to a proficiency in art which was afterwards lost again.

and would have served as a challenge to rivals. It is, therefore, probable that the imitation of musical cries by articulate sounds may have given rise to words expressive of various complex emotions."[16]

That in the origin of language the imitation of animal sounds, as Darwin supposes, has played a part is very probable, since a sound produced by the mere impulse of imitation must very easily have acquired significance. The raven, *e.g.*, that imitates out of its own head the barking of the dog and the cackling cries of hens, certainly connects with these sounds the idea of the kinds of animal in question, since it knows to what animals these cries belong, and to what not. It has, therefore, in its invention a foundation for the formation of ideas, the beginnings of which are by no means unknown to the animals. The reflex natural sounds of surprise, fright, &c., must without this have been intelligible to all similarly organised beings, since even in the animals they form an unmistakable means of intelligence. Here we have a subjective, there an objective element of the formation of speech. The combination of the two must give to the subjective element stricter form, to the objective element greater content.[17]

If we regard the history of human civilisation in the light of the latest researches, we are reminded by the

[16] Descent of Man, 2d ed., 87.

[17] It would lead us too far to enter here upon a discussion of the so warmly controverted question of the origin of language. Let it only be observed, that the attempt to find in any factor of speech, *e.g.*, in the formation of significant roots, an 'absolute' distinction between man and animal, must break down as completely as any other proof of such supposed absolute distinctions. All the separate factors of human life and civilisation are of a general kind; but so far as every genuinely imprinted peculiarity has in its persistence something absolute, we may say that an absolute distinction of man from the animals lies in the peculiar way in which here all relative distinctions co-operate in order to produce a particular form. The like absolute peculiarity of form belongs in this sense, of course, also to the animal species, and by no means involves any immutability. In man, however, it attains a higher significance, not from the standpoint of natural history, but of ethics; and here it is quite adequate to establish, *e.g.*, the distinction between the intellectual and the 'animal.'

course of the results of the lines of a hyperbola, whose co-ordinates, representing the development of civilisation, at first rise with infinite slowness over immense tracts of time, then quicker and quicker, until finally there follows an immense progress in a moderate space of time. We use this figure in order to make perfectly clear an idea which seems to us of importance. It is very different with the development of the physical and even of the psychical qualities of nations. Here the progress in the aptitude of individuals and nations appears only a very slow and gradual one. This is doubtless due to the fact that man, with the same capacities, attains a much higher goal if he is in a very advanced environment, then if he grows up amidst the rudest traditions. It seems almost as if a very moderate aptitude is sufficient to enable him in the course of some twenty years of childhood and youth so far to familiarise himself with the most developed civilisation as to take an active and independent part in it. But if we reflect that in earlier ages, for the most part, mere *facts* and isolated experiences or contrivances were handed down, while modern times hand down also *methods*, by means of which whole series of discoveries and inventions are attained, we easily see the reason of the rapid progress of contemporary civilisation, without, therefore, being obliged to descry in the present a sudden advance of humanity to a higher intellectual and physical existence. Nay, as the individual often attains to his most important intellectual productions only at an age when the powers of his brain are already in decline, so, too, it is not in itself inconceivable that there by no means underlie our present advance that elastic youthfulness and energy of humanity which we are so ready to suppose. We are far from laying down in this respect any positive view, for which no one has the necessary evidence. But we cannot leave the subject of the development of the human race without at least pointing out how little objective foundation there is for the dogma of the continual

progress of humanity. The short span of history, which, of course, does not afford us sufficient material to admit of even a probable empirical law, to say nothing of a 'law' properly speaking, has shown us already more than once how external development and internal mortality may go in a nation hand in hand, and the inclination of the masses as well as of the 'cultured' to care only for their material welfare and to submit to despotism, has been in antiquity, and perhaps, too, in several Oriental peoples, a symptom of such internal mortality. We have thus indicated the theoretical position of a question which we propose in the last Section to consider from a very different point of view.

As the question of the Age of the Human Race concerns Materialism at bottom only as the most obvious and palpable opponent against vague theological ideas, while it has little to do with the innermost basis of specific Materialism, so is it also with the question of the Unity of the Human Race. This question is merely another form of the question of Descent from a Single Pair, as Cuvier's theory of the Revolutions of the Earth was another form of the tradition of the Creative Days, and as the doctrine of the Immutability of the Species may be referred to Noah's Ark. But for our very gradual deliverance from these traditions, science, which professes to be so unprejudiced, would never have treated these questions so passionately, and the conflict of the greater error with the less has here too been a source of much profitable knowledge. In order to determine a matter of which no one has a clear conception, namely, whether mankind is a unity, skulls have been measured, skeletons studied, proportions compared; and at all events ethnography has been enriched, the sphere of physiology widened, and innumerable facts of history and anthropology gathered and saved from oblivion. But as to the main point all this industry has decided nothing, except perhaps this, that the innermost spring of these discussions lies not in a purely

scientific interest, but in great party questions. The matter was the more complicated in that, besides the supposed religious interest, the North American slave question has occupied a great share in this controversy. In such cases men easily content themselves with the cheapest and most threadbare arguments, to which emphasis is then lent by pomp of erudition and the varnish of scientific form. Thus the work of Nott and Gliddon in particular ('Types of Mankind,' 1854), is completely saturated with the American tendency to represent the negroes as creatures of the lowest possible kind and of almost brutish organisation; but as previously the opposite tendency had dominated the treatment of these questions, this very book contributed greatly to a sharper appreciation of the characteristic features of races. The in many respects excellent 'Anthropologie der Naturvölker' of Waitz (too early lost to science) suffers, on the contrary, from a constant exaggeration of the arguments for the 'unity' of mankind. This goes so far that Waitz frequently appeals to the utterly untrustworthy and unscientific Prichard; that he still regards Blumenbach (1795!) as the first authority on questions of the differences between species and races; that he honours Wagner's collection of cases of hybridism (in Prichard) with the epithet "careful," and finally commits himself to this sentence: "What importance, in fact, could be attributed even to specific differences in nature, and how fortuitous would their fixity appear, if their effacement were possible by continuous hybrid productions!" That from such a standpoint nothing can be accomplished for the main point, even if its solution were in itself possible, needs no proof. What may happen in fact when people attempt by painful periphrases to prove things that may any minute be refuted by experience, may appear from the single illustration that Waitz quite calmly adduces hares and rabbits as different species, while M. Roux in Angoulême for eight years had been attaining excellent

results with his three-eighth hares—a new species of animal, or race, if it is preferred, invented by him.[18]

The idea of the unity of mankind no longer needs the support which it may once have found in the doctrine of a common descent; although we may doubt whether the myth of Adam and Eve exercised any softening influence on the relations of the Spaniards with the Indians, or the Creoles with their Negro slaves. The essential points —the extension of the claim to humanity to men of every race, the maintenance of equality before the law in the national commonwealth, the application of international law in neighbourly intercourse—may very well be established and maintained, without therefore bargaining for absolute equality in the capacities of different races. But the descent from a common primitive stock by no means guarantees equal capacities, since to lag behind in development for thousands of years might finally lead to any given degree of inferiority. Only so much seems to be guaranteed by the concurrent descent, that a backward race, or even one that has become hardened and perverted in its lower qualities, might yet, by circumstances which we cannot calculate, be led to a higher development. But this, on the principles of the doctrine of descent, must always be conceded as a possibility not only for backward human races but even for the animals.

The 'descent from the ape,' which is most bitterly denied by those who are least raised by inner dignity of

[18] It has been attempted to make this very case of successful crossing a witness for this immutability of species, by asserting that M. Roux's three-eighth hares, by continued breeding in, return entirely to the maternal rabbit-type (Rev. des Deux Mondes, 15 Mar. 1869, p. 413 ff.). But this is by no means to refute the persistence of the crossed race, and as little can it be said that the new 'rabbits' do not differ very essentially and permanently from the primitive maternal stock, for otherwise there would be no object in breeding them. It is not necessary to waste a single word on this main point, since these creatures, as well as similar productions, form a notable article of commerce. But as to the tendency of the middle form to return to one of the two types maintained and consolidated for thousands of years, this is entirely in harmony with what has been said above, p. 43 ff.

mind above the sensual basis of our existence, is of course in the strict sense not a consequence of Darwin's theory. This goes rather to indicate in the earlier history of man a common stock,[19] from which on one side, tending upwards, man branched off, and on the other, persisting in the animal form, the ape. Thus the ancestors of man must be conceived as being indeed formed like the ape, but already endowed with the disposition to a higher development, and something like this appears to have been Kant's idea. Things look still more favourable for the traditional pedigree of man on the hypothesis of polyphyletic descent. Here we may carry back man's advantage in the capacity for development to the first beginnings of organic life. It is, nevertheless, obvious that this advantage, which is at bottom merely a convenience in the arranging of our thoughts and feelings, cannot throw the least weight into the scale in favour of the polyphyletic theory; for otherwise the scientific grounds would be corrupted by the admixture of subjective and ethical motives. And, in fact, much is not

[19] The 'descent from the ape' derives its hatefulness in the popular objection to Darwinism, of course, only from the comparison with the *now existing apes*, on which alone the popular idea of the nature of an ape is formed. It may here, therefore, be quite indifferent whether or not this obsolete ancestral form is in the zoological sense described as an 'ape,' as it had at all events very different qualities from the present apes. Oscar Schmidt (Doctrine of Descent, &c., E.T. p. 292 f.) says on this: "The development of the anthropoid apes has taken a lateral course from the nearest human progenitors, and man can as little be transformed into a gorilla as a squirrel can be exchanged into a rat. . . . The bony skull of these apes has reached an extreme comparable to that of our domestic cattle. But this extreme appears only gradually in the course of growth, and the calf knows little of it, but possesses the cranial form of its antelope-like ancestors. . . . Now as the youthful skull of the anthropoid apes exhibits, with undeniable distinctness, a descent from progenitors with a better-formed, still plastic cranium, and a dentition approaching that of man, the transformation of these parts, together with the brain—the latter by reason of its persistently smaller volume—has, as it were, struck out a fatal path, while, in the human branch, selection has effected a greater conservation of these cranial qualities." Comp. the same writer's lecture, Die Anwendung d. Descendenzl. auf den Menschen: Leipz. 1873, S. 16–18. Haeckel, Natürl. Schöpfungsg., 4 Aufl., S. 577, E.T. ii. 268.

gained for the pride of man, on a closer examination, by this merely superficial removal from the animal stock; and much need not be gained for this pride, since it is but an unjustifiable rebellion against the idea of the unity of nature and of the uniformity of the formative principle in the great whole of organic life, of which we form only a part. Let us give up this unphilosophical rebellion, and it will be found that to proceed from an already highly organised animal, in which the light of thought manifests itself creatively, is fitter and more agreeable than to proceed from an inorganic clod of earth.

However far we may, on scientific grounds, remove man from the existing apes, we shall not be able to refrain from carrying back into his earlier history a number of characteristics of the ape which are now most repulsive to us. Snell, who in his clever treatise on the 'Schöpfung des Menschen' (Jena, 1863), has very nearly attained his object of combining the most rigorous requirements of science with the conservation of our moral and religious ideas, is at all events wrong in believing that humanity must have announced itself, even in the earlier animal forms from which it arose, by something salient and presentient in look and gesture. We must by no means confound the conditions of perfectibility with an early appearance of their results. What now appears to us most noble and sublime may very well only unfold itself as the last blossom of a calmly and safely passing life, richly saturated with familiar impressions, while the possibility of such a life must be attained by very different qualities.

The first step towards the possibility of the civilisation of man was presumably the attaining of superiority over all other animals, and it is not probable that he employed for this end essentially different means from those which he now employs with the object of lording it over his kind. Cunning and cruelty, savage violence and lurking knavery, must have played an important part in those struggles; nay, the fact that even now, when he might succeed so

much better with a little exercise of reason, he is continually relapsing into those freaks of the robber and oppressor, may perhaps be derived from the reaction of his struggle for thousands of years with lions and bears, and earlier still perhaps with anthropoid apes. This by no means excludes the simultaneous development of genuine virtues side by side with intelligence in the circle of the tribal and family community. Let us only think for a moment of the enormous gulf which even in ancient civilisation still prevails between the internal life of the individual states and towns and their often infinitely barbarous behaviour towards defeated foes!

We cannot, therefore, even on psychological grounds, reject the relationship of man with the ape, even though it were on this score, that at least the ourang and the chimpanzee are much too gentle and peaceable for those cave-dwellers to have proceeded from them, who conquered the gigantic lions of primeval times and greedily devoured the smoking brains from their shattered skulls.

CHAPTER II.

BRAIN AND SOUL.

We take up the old and favourite theme of Materialism, which it is indeed no longer so easy to dispose of as in the last century. The first intoxication of great physical and mathematical discoveries is over; and as the world, with each fresh deciphering of a secret, offered yet new riddles, and as it were visibly grew great and wider, so there revealed themselves, too, in organic life abysses of unexplored connexions which as yet had been hardly thought of. An age that could quite seriously believe that in the mechanical masterpieces of Droz and Vaucanson[20] it had come upon the traces of the secrets of life, was hardly capable of measuring the difficulties which have accumulated in the mechanical explanation of psychical phenomena only the higher as we have gone on. Then the childishly naïve conception could still be put forward with the pretension of a scientific hypothesis, that every idea has its particular fibre in the brain, and that the vibration of these fibres constitutes consciousness.

The opponents of Materialism of course easily showed that between consciousness and external motion there is an impassable gulf; but natural feeling made no great matter of this gulf, because we easily see that it is inevitable. In some form or other the opposition of subject and object always recurs, only that in other systems it may be more easily bridged by a phrase.

If in the last century, instead of this metaphysical

[20] *Vide* vol. ii. p. 75.

objection, all the physical experiments had been made which are now at our service, Materialism would perhaps have been defeated with its own weapons. Perhaps, too, not; for the same facts which dispose of the then views of the nature of the cerebral activity, strike no less heavily perhaps at all the favourite ideas of metaphysics. There could hardly be propounded, in fact, a single proposition as to brain and soul which is not refuted by the facts. There are, of course, excepted partly vague generalities, as, *e.g.*, that the brain is the most important organ for the activities of the soul; partly propositions relating to the connexion of particular parts of the brain with the activity of particular nerves. The unfruitfulness of brain investigations is due, however, only partially to the difficulty of the matter. The main cause seems to be the entire absence of any workable hypothesis, or even of any approximate idea, as to the nature of the cerebral activity. So that even educated men constantly fall back again, as it were from despair, upon the theories, long since refuted by the facts, of a localisation of the cerebral activity according to the various functions of the intellect and the emotions. We have, it is true, repeatedly expressed ourselves against the view that the mere continuance of obsolete opinions is so great a hindrance to science as is commonly supposed; but here it does in fact appear as though the phantom of the soul showing itself on the ruins of Scholasticism continually confuses the whole question. We could easily show that this ghost, if we may so designate the reaction of the obsolete doctrines of the school-psychology, plays a great part amongst the men who consider themselves entirely free from it, amongst our Materialistic leaders; nay, that their whole conception of the way in which we must conceive the cerebral activity is essentially dominated by the popular conceptions which were formerly held as to the mythical faculties of the soul. Yet we believe that these conceptions, if only a rational positive idea appears as to what is

properly to be expected of the functions of the brain, will disappear just as easily as they now stubbornly maintain their ground.

Here we cannot but think above all of the crudest form of this theory of localisation, viz., of Phrenology. It is not only a necessary point for our historical treatment, but at the same time, because of its intelligible working out, a suitable subject for the development of those critical principles which will farther on find an extended application.

When Gall propounded his theory of the composition of the brain from a series of special organs for special mental activities, he started from the entirely correct view that the commonly accepted primary faculties of the soul, such as Attention, Judgment, Will, Memory, &c., are mere abstractions; that they classify the various modes of cerebral activity, without however possessing that elementary significance which is ascribed to them. He was led by observations of the most various kinds to assume a series of primary organs in the brain, whose prominent development was supposed to lend the individual certain permanent qualities, and whose joint action to determine the individual's whole character. The mode in which Gall made his discoveries and ranged his proofs was that he sought for some very striking examples of particular peculiarities, such as may easily be found amongst criminals, lunatics, and men of genius or eccentricity. He looked now on the skull of the individual in question for a particularly prominent spot. If it was found, the organ was provisionally treated as discovered, and next 'experience,' comparative anatomy, animal psychology, and other sources had to lend their aid to confirm it. Many organs were established merely on observations in the animal world, and then carried farther in the case of man. Of more exact scientific method there is in Gall's procedure not the faintest trace discoverable, a circumstance that was not unfavourable to the spread of his theory. For this kind of inquiry every one has talent and aptitude; its results

are almost always interesting, and 'experience' regularly confirms the doctrines which are built upon such theories. It is the same kind of experience which confirmed Astrology too, which still confirms the healing power of most medicines (not merely the homœopathic ones), and which daily renders manifest the visible aid of saints and deities in such surprising instances. Phrenology is, therefore, not in bad company; it is not a relapse into some fabulous degree of fantasy, but only a fruit of the common soil of the sham sciences, which even yet form the great mass of the learning on which jurists, doctors, theologians, and philosophers pride themselves. Its position is indeed hazardous, in that it falls within a sphere which very well admits of all the cautions of the exact sciences, and that it is nevertheless carried out without any kind of regard to the requirements of scientific method; yet even this it has at least in common with homœopathy.

Our present phrenologists defend their opinions, as a rule, by violent tirades against those objections which are often levelled against sham science without much reflection, because no one cares to trouble himself seriously with the matter. Any attempt, on the other hand, at a positive foundation will be sought in vain in the modern treatises on phrenology. While Gall and Spurzheim worked at a time when the methods of investigating such subjects were still quite undeveloped, our modern phrenologists engage in sterile polemics instead of doing even slight justice to the enormous progress of science. It still holds, as Johannes Müller said in his 'Physiology': "With regard to the principle, its possibility cannot *a priori* be denied; but experience shows that the system of organs proposed by Gall has absolutely no foundation in facts, and the histories of injuries to the head are directly opposed to the existence of special regions of the brain destined for particular mental activities."[21] Some examples may make this

[21] Handbuch d Phys. d. Menschen, 3 Aufl., 1837, i. 855.

clear. Castle, in his 'Phrenology,' adduces after Spurzheim several cases of loss of considerable portions of the brain, in which the intellectual faculties, it is said, suffered no interruption. He complains that in all these cases the locality of the injury is not properly given. Had the injury in question been in the cerebellum, "even a phrenologist can admit, without the slightest difficulty, that the thinking faculty might remain uninjured."[22] The apologetic standpoint here is unmistakable. One would think, since the opposite possibility was equally justified, that the phrenologist must try to get hold of such cases; above all, one would expect that in a case which came under his own observation he would endeavour to ascertain quite accurately the injured organs and the degree of injury, and that he would then observe and ascertain the mental activity of the individual in question as a true *instantia praerogativa* with the utmost carefulness and keenness. Instead of this, Castle actually offers us with unsuspecting calmness the following narrative:—

"I myself had the opportunity of observing a similar case. An American had received a quantity of shot in the occiput, which resulted in his losing a part of the skull, and besides, as he himself expressed it, 'several spoons-full of brain.' It was said that his intellectual faculties were unaffected. According to his own account, the sufferings he felt arose from the nerves. His position obliged him to speak very often in public; he had, however, lost the energy and firmness which previously distinguished him. This fact was employed as a proof against the phrenologists—a proof as credible as all similar ones—though it is easy to see that it is entirely consonant with the principles of this science. The injured spot of the brain was not the seat of the intellectual faculties, but was that of the animal energy, which accordingly was the only thing affected."

This, in fact, is enough. No information as to the

[22] Die Phrenologie, 1845, S. 27 f.

injured organs, as to the extent of the wound or scar! Considering the great part which the 'duplicity' of the brain-organs plays in the apology for untenable theories, we should at least have been told whether the injury to the 'occiput,' which carried away 'a part of the skull' and 'several spoons-full of brain,' was in such a spot that the organs of the one half might be supposed to have been uninjured. If the shot struck the middle of the occiput to a moderate extent, it might easily have totally destroyed the organ of 'Philoprogenitiveness.' How was it with this organ? How was it with 'Concentrativeness' and 'Habitativeness'? How with 'Cohesion'? Nothing of all this! and yet all these organs lie in the occiput, and a case of their partial destruction would have been for a man of scientific zeal—always supposing that such a man could be a phrenologist—quite invaluable. The 'animal energy' had suffered. This, at any rate, might point to 'Combativeness,' which lies at one side of the occiput; but we must unfortunately conjecture that, if the shot had struck this organ, Castle would hardly have omitted to let us know it. The man had 'lost the energy and firmness which previously distinguished him!'

Thus, then, we must not be surprised if the phrenologists still quite cheerfully regard the cerebellum as the organ of the sexual impulse, although Combette in 1831 observed a case of strong sexual impulse with an entirely absent cerebellum, and although Flourens in a cock from which he had excised a great part of the cerebellum, and which he kept alive for eight months, found the sexual impulse still persisting.[23]

The frontal lobes of the cerebrum have to carry a mass of such important organs, that the destruction of a part of them in serious injuries of this region must always become noticeable, especially as intelligence, talent, &c., are here concerned, the disappearance of which is easier to

[23] Comp. Longet, Anat. et Physiol. du Système Nerveux, i. p. 765; and p. 768.

establish than the change of a moral quality. Yet in the large number of brain injuries in the frontal part of the head, which have been under exact scientific observation, nothing has ever yet been found that can be made without extreme violence to point in this direction. Recourse is had, of course, to the duplicity of the organs; but how does it come to pass that the reduction of an organ to one-half does not perceptibly change the character, while a moderate prominence or depression in the skull is enough to explain the most striking contrasts of the whole mental nature? But let us not weaken our criticism by an exposition against which at least a hypothesis can be invented! There are even cases in which quite unequivocally *both* frontal lobes of the cerebrum have been seriously affected and destroyed, and in which not the least disturbance of intelligence was observed. Longet reports two such cases which had been thoroughly observed. One such instance, however, is enough to overturn the whole system of phrenology.[24]

And not only the system of phrenology; for the doctrine of the seat of intelligence in the frontal lobes of the cerebrum has been shared by many anatomists who by no means stood on so narrow a basis; and yet there is absolutely nothing either in the more general localisation by larger groups of mental qualities. Series of very arbitrarily chosen skulls of great men have been taken, and as a rule, though not always, the forehead has been high and broad. But it has been forgotten that even if a large frontal development coincides as a rule with great intelligence, there is as yet not the slightest proof of a localised activity in these parts of the brain. For while all the facts hitherto observed lead to the conclusion that the various portions of the cerebrum have essentially the same destination, it may yet very well be that a particularly favourable organisation of the whole is also connected with a particular form of it.

[24] Longet, *loc. cit.* i. 671 ff..

To the objections against which a part of our modern phrenologists bitterly turn their weapons, belongs also the observation that phrenology necessarily leads to Materialism. This is about as correct as such general propositions generally are; that is, it is obviously false. Phrenology, if it were scientifically justified, might not only be excellently supported on Kant's system, but it may, in fact, be harmonised with those obsolete ideas according to which the brain is related to the 'soul,' much as a more or less perfect instrument is to the person playing it. It is always noteworthy, however, that our Materialists, and amongst them men of whom it would certainly not be expected, have expressed themselves surprisingly in favour of phrenology. So B. Cotta; so too especially Vogt, who in his 'Bilder aus dem Thierleben' wrote the characteristically hasty words: "Is phrenology, therefore, true to its minutest application? Must every change of function have been preceded, or rather simultaneously accompanied, by a material change of the organ? I cannot but say, Truly it is so."

The reason of this inclination is easily perceived. The general principle, that is to say, that thinking is an activity of the brain, may in this generality be made very probable, without therefore being made very effective. Only when we succeed in following up this activity, in resolving it somehow into elements, and in demonstrating in these elements still the correspondence of the physical and the mental, only then will this mode of regarding things be generally adopted, and great weight attributed to it in the formation of our collective theory of things. If we can, moreover, construct the character of man from such knowledge, as astronomy predicts the position of the heavenly bodies from the laws of their motion, then the human mind can no longer resist the theory which produces such fruits. Our Materialists are of course not such phantasts as to credit phrenology in its present state with these performances. Vogt has in other works repeatedly expressed

himself quite unequivocally as to the unscientific character of this theory; Büchner treats phrenology indeed with conspicuous tenderness, but admits that "the most important scientific considerations are opposed to it." The unhappy 'innate ideas,' however, are followed up even into the hiding-place of a barely possible phrenology. In order to dispose of a sort of innate ideas, which is entirely strange to modern philosophy, and only exists in popular and homiletic writings and speeches, he thinks he must also controvert the conclusions which have been drawn in favour of innate ideas from phrenology. He overlooks in the heat of the fight that innate ideas, which necessarily result from the structure and composition of the soul, entirely harmonise with the most consistent Materialism; nay, that such a supposition goes farther, and would more entirely agree with the rest of his principles than the standpoint of Locke's *tabula rasa*, where he himself stands. But as no important modern philosopher believes in ideas which unfold themselves without any influence of the external world, or lie already conscious in the foetus, so too no phrenologist could suppose that the sense of sound could develop and become active without sounds, or the sense of colour without colours. The controversy is only between the one-sided view of Locke, which dominated the last century in a degree difficult to understand, that the whole intellectual content comes through the senses, and between the other view, on which the brain or the soul brings with it certain forms, by which the shaping of sense-impressions into concepts and ideas is predetermined. Perhaps these forms have sometimes been conceived too much as matrixes, into which the type-metal is poured, or as earthen pots, which are filled with the sense-impressions as with water from a spring. However much these sherds may be shattered, it still remains true that there are material conditions present which exert the most essential influence on the formation of all ideas. In order to controvert such an influence in reference to a merely

possible phrenology, Büchner propounds the hypothesis that the relation of phrenological organs and external impressions may also be inverted, inasmuch as "at the time when the brain is growing and forming, by means of continued and repeated external impressions and psychical activity in a particular direction, the phrenological organ in question is also materially more strongly developed—exactly as a muscle is strengthened by exercise." "Good!" the phrenologist will say; "but still the muscles are innate; they are different even from birth, and it can hardly be denied that in like circumstances a strong-muscled child will exert its muscles more than a weak-muscled child can. Deny the innate brain, and you will also have denied the innate tendencies of the mental activity!" But Büchner does not go so far as that. He exclaims: "Nature knows neither purposes nor aims, nor any mental or material conditions forced upon her from outside and above her!" Well, if nothing more is meant, if the conditions of our ideation coming from within outwards and springing from Nature herself are conceded, why all this fuss?

Here, again, we are brought sharply to the main point of the whole materialistic controversy. *Why* all this fuss? Well, perhaps in order to meet the hypocritical affectation of modern science. Never was the gulf between the thought of this privileged society and the masses greater than now, and never had this privileged society so completely made its egoistic and separate terms of peace with the unreason of existing things. Only the times before the fall of ancient civilisation offer a similar phenomenon; but they had nothing of that democracy of Materialism which to-day half-consciously, half-unconsciously, revolts against this aristocratical philosophy. It is easy from the standpoint of this philosophy theoretically to refute Materialism, but difficult to destroy it. In practical debate Materialism playfully breaks up all those esoteric subtleties, in shattering the crude exoteric ideas with

which they have formed so delusive an alliance. 'We never meant anything of the kind!' cries terrified Science; but she receives as answer: 'Speak plainly and for every one or die!' Thus there towers up behind the logical criticism of Materialism its historical importance, and therefore too it can only be adequately appreciated in an historical inquiry.

We will then, like Büchner, assume for a moment that there is a phrenology, in order to submit the whole idea of the localisation of the mental functions to a criticism in which for the present we leave out of view the opposing facts of pathological anatomy. For convenience we will take the theory as it was developed by Spurzheim, Combe, and others, and as it is pretty widely spread in Germany. We have, then, somewhat such a picture as this of the processes of concrete thinking.

Each organ has its own special activity, and yet the activity of all co-operates towards a joint effect. Each organ thinks, feels, and wills for itself; the man's thinking, feeling, and willing is the result of the sum of these activities. In each organ there are manifold degrees of mental activity. The sensation rises to conception and finally to imagination, as the thinking excitability of the organ is weaker or stronger: emotion may become enthusiasm, impulse may become desire, and finally passion. These activities have reference only to the matters which are natural to each organ. "Each mental organ," says one of our cleverest phrenologists, "speaks its own language and understands the language which it speaks itself; conscience speaks in matters of right and wrong; benevolence only in matters of sympathy, and so on." Through their union into a whole there then result the more general phenomena, such as 'Understanding,' as an activity of the whole six-and-thirty faculties of thought; they co-operate, however, in the particular individual activities of man, partly in antagonism, partly in support,

in modification, and so on, like a group of muscles in the movement of a limb.

We see at the first glance that this whole way of regarding things moves in the most shadowy abstractions. Gall wished to put in the place of the conventional mental faculties natural and concrete bases of psychology. In this he apparently succeeded by means of the hypothesis of his supposed organs; but so soon as we come to the activity of these organs the old shadow-play begins again. Gall himself, it is true, concerned himself little with such developments, and even yet it is hardly clear to the majority of his disciples that we must be able to form some notion of the mode of activity of these organs. Phrenology might, indeed, be actually correct so far as regards the correspondence of cranial formation with intellectual qualities, without our therefore having the slightest information as to the manner of the cerebral activity. If the brain, and consequently the skull, forms a prominence at the top of the head and towards the front, it by no means follows that the convolutions lying at this spot are exclusively occupied with emotional sympathy, and so on.

What, then, is the meaning of 'sympathy'? When I hear a child crying piteously in the street, I feel besides the waves of sound a series of sensations, especially in the muscles of the respiratory apparatus (and hence the ancients placed the feelings in the breast). Moreover, one person may have a quickened beating of the heart, another a peculiar feeling in the epigastric region, and a third a feeling as though he must cry too. Simultaneously there comes up the idea of succour. A slight innervation of certain locomotor muscles is set up, as though I must turn towards the child and ask what is the matter. The association of ideas pictures to me my own children in helplessness; there arises an image of the parents of the crying child, who might comfort it, and are not there. I think of various causes—perhaps the little one is lost, perhaps

half-starved or cold, and so on. At last I run, with or without a special resolve, to the aid of the little screamer. I was *sympathetic;* have perhaps made myself ridiculous by needless sympathy; perhaps, too, intervened at the right time. At all events, I was so organised that the symptoms above described occur more easily and quickly with me than with others, just as one man must sneeze sooner under the stimulus of snuff than another. The moral judgment calls the first quality good, the latter indifferent; but physically the phenomenon is related somewhat as a line from a symphony of Beethoven and the piece of some musician at a fair, both of which consist of sequences of sound. What now is sympathy? Was the sound of the child's cry carried to the organ of benevolence, which alone understood this language? Did there arise in this organ first sensation, excitation, impulse, then at last will and reflection? Was the will to help then carried back ready-made from this organ to the central focus of motion, to the medulla oblongata, which put itself on this occasion at the disposal of the organ of benevolence? This way of representing things only pushes the difficulty farther back. We conceive the activity of the organ as that of an entire man; we have the most reckless anthropomorphism applied to individual parts of man. In the organ of benevolence everything must concur; not only thinking, feeling, and willing, but also hearing and seeing. If I renounce this anthropomorphism, which only postpones the matter to be explained, nothing can appear to me more probable than that in the phenomenon under consideration my whole brain was engaged, although in very various degrees of activity.

Here the phrenologist falls upon me, and flings at me all the ignorance of his science. He too assumes an activity of the whole brain, or at least of great groups of organs, only that Benevolence takes the lead in this case. What was the object of sympathy? A child? Then 'Philoprogenitiveness' is also at work! How is the boy

to be helped? Shall I show him the way? There is 'Locality' engaged; 'Hope' and 'Conscientiousness' appear; 'Judgment' has its share in the proceedings. But these organs think, feel, will, each for itself. Each hears the cry, each sees the child, each imagines causes and consequences, for each of these organs has its own imagination; the difference is only that Benevolence gives the ruling tone with the idea: 'Here is some one suffering, and help must be given!' 'Certainly,' says Conscientiousness; 'to help our fellow-men is a duty, and duties must be observed.' 'It will be easy to comfort the little thing,' thinks Hope. Then there arises opposition in the cerebellum. 'Don't make oneself absurd,' cries 'Love of approbation;' and 'Cautiousness' points out that her neighbour, 'Love of approbation,' is quite right, and that the thing must be well considered. The predominant feeling asserts meanwhile some egoistic reasons in favour of help, and finally the 'Impulse of activity' leads to the closing of the debate and to a decision. We have a parliament of little men together, of whom, as also happens in real parliaments, each possesses only one single idea, which he is ceaselessly trying to assert.

Instead of *one* soul, phrenology gives us nearly forty, each in itself as mysterious as the life of the soul is generally. Instead of resolving it into real elements, it resolves it into personal beings of various character. Men and animals, the most complicated of machines, are the most familiar to us. We forget that there is something to be explained in them, or we only find the matter 'clear' when we can imagine everywhere little men over again, who are the bearers of the entire activity. "Indeed, sir, and there is a horse inside!" cried the peasants at X——, when their spiritual shepherd had spent some hours in explaining the nature of the locomotive. With a horse inside everything becomes clear, even though it must be a rather wonderful horse. The horse itself needs no farther explanation.

Phrenology takes a run in order to get beyond the standpoint of the spectral soul, but it ends by peopling the whole skull with spectres. It falls back to the naïf standpoint, which will not be content without putting a machinist to sit in the ingenious machine of our body to guide the whole, a virtuoso to play the instrument. A man who has marvelled all his life at a steam-engine and never understood it, might perhaps think also that there must be in the cylinder again a little steam-engine, which produces the to-and-fro action of the piston.

Was it, however, worth while to deal at such length with wholly unscientific phrenology to gain nothing but a new example of the long-known "irresistible tendency to personification," which has created this flock of active intellectual faculties? Though it may be that some representatives of Materialism have come nearer this view than they should have done, it has, nevertheless, had but little influence on the development of modern nerve-physiology.

Well, but the great reason why there has hitherto been no progress in our explanations of the relation of the brain to the psychical functions seems to us to lie simply in the same ground which doomed phrenology to failure—in the personification of abstract ideas instead of the simple apprehension of the actual, so far as it is possible. What is the way that leads us to the brain? The nerves. In them we have before us a part of that complicated mass as it were unfolded before us. We can experiment on the nerves, since we have before us what is assuredly a single thing. In them we find conduction, electric currents, effects on the contraction of the muscles, on the secretion of the glands; we find reactions on the central organs. We find the peculiar phenomenon of reflex movements, which have already with a very promising tendency towards better things been repeatedly regarded as the primary element of all psychical activity.[25] How

[25] Comp. Piderit, Gehirn u. Geist; 1863. Here, of course, the idea of a Entwurf einer physiol. Psychologie, resolution of mental activity into re-

seriously personification stands in the way, or rather how hardly from habitual conceptions emerges the true idea, viz., to derive the personal from the impersonal, is shown in a most notable example by the history of Pflüger's experiments on the psychical importance of the spinal centres. Pflüger showed with great ingenuity and experimental skill that decapitated frogs and other creatures, even amputated tails of lizards, for a considerable time make movements to which we cannot refuse the character of adaptation. The most interesting case is this:—A frog, decapitated, is smeared on the back with acid; it wipes the drop away with the most convenient foot. Now this thigh is cut off; it tries with the stump, and as several efforts are unsuccessful, it at last takes the opposite foot, and completes the movement with this. This was no mere reflex action;—the frog seems to consider. It forms the conclusion that it can no longer attain its object with the one foot, and so it makes the attempt with the other. It seems demonstrated: there are spinal souls, actually tail-souls. Only a soul can think! Whether it is a materialistic soul, too—that is not the matter in dispute; but the entire frog is represented in its spinal marrow. There it thinks and decides after the manner of frogs. A scientific opponent now takes an unhappy frog, beheads it, and boils it slowly. To make the experiment quite perfect, it is proper that a frog which still enjoys its head should be boiled with it, and that another decapitated specimen should be placed alongside the pot for exact comparison. Now the result is that the beheaded frog quietly lets itself be cooked without struggling against its fate like its more perfect companion in misfortune. Conclusion: There are no spinal souls; for

flex activity is still combined with the untenable distinction of an "organ of ideation" and "organ of will." Wundt, who has not only sketched but also carried out most admirably a 'physiological psychology,' shows at S. 328 f. quite clearly the complete analogy between the "compound brain-reflexes" and the spinal reflexes. Comp., too, Horwicz, Psychol. Analysen, 1872, S. 202.

if there were, it would have noticed the danger from the rising heat, and must have thought of flight.[26]

Both conclusions are equally forcible. Pflüger's experiment, however, is more valuable, more fundamental. Let us drop personification; let us cease to seek everywhere in the parts of the frog thinking, feeling, acting frogs, and try instead to explain the phenomenon out of simpler phenomena, *i.e.*, from reflex movements, not from the whole, the unexplained soul. Then we shall easily discover, too, that in these already so complicated sequences of sensation and movement there is afforded the beginning of an explanation of the most complicated psychological activities. This would be a path to follow up.

And what is there to prevent it? Lack of invention or ingenuity for the most difficult experiments? Assuredly not. It is the lack of perception that the explanation of psychical life requires us to carry it back to individual processes which form a necessary part of the activity, but which are utterly and entirely distinct from the mode of action of a complete organism.

But the reflex movement happens unconsciously; and therefore the most composite activity of this kind cannot explain consciousness!

Another objection of the crudest prejudice. Moleschott, as a proof that the consciousness is only in the brain, alleges the well-known observation of Jobert de Lamballes, according to which a girl injured at the top of the spine remained conscious for half an hour, although the whole body, with the exception of the head, was completely paralysed. "Thus the whole spine may become inactive without the consciousness being affected." Good! But when it is concluded from this case that decapitated crea-

[26] Comp. Pflüger, Die sensorischen Functionen des Rückenmarks der Wirbelthiere, Berl. 1853; and, on the counter-experiment, Goltz, Die Functionen der Nervencentren des Frosches, in the Königsberg. Med. Jahrb. ii. (1860). For a detailed account, especially of the latter experiment, see Wundt, Vorles. über d. Menschen-u.-Thierseele, Leipz. 1863, ii. 427 ff. Comp. besides, Wundt, Physiol. Psych., 824-827.

tures have no sensation and no consciousness, Moleschott overlooks that the head separated from the spine might show its consciousness in a way we can understand, but not the trunk. What sensation and what consciousness there may or may not be in the spinal centres when separated from the head, we cannot possibly know. This only we may certainly assume, that this consciousness can do nothing that is not based in the mechanical conditions of the centripetal and centrifugal nerve-conduction and the constitution of the centre.

We may not therefore conclude, either, that the spinal centres feel, and *therefore* can do more than a mere mechanism. On the contrary, that the thing takes place quite mechanically is not only certain *a priori*, but, by way of supererogation, is established also by the counter-experiment of gradual heating. For the one class of stimuli there exists in the spine of the frog mechanism producing adapted reflex actions, but for the other class not. Whether in the latter case sensation too is wanting, or only the capacity to react upon the sensation by manifold movements, we do not know. It is, however, not improbable, although we have nothing here to support us but analogy, that everywhere where sensation arises there is also an apparatus to react upon the sensation; conversely we may assume that every reflex apparatus carries with it at least the possibility of a sensation, however weak, while it remains, of course, very doubtful whether, in a whole and sound creature, any part of this sensation of the subordinate centres comes clearly into consciousness.[27]

[27] We are not, therefore, by any means inclined to regard the reflex act itself as that which objectively corresponds to the (subjective) sensation: this would rather be the opposition which the reflex act has to overcome in the central organ, so that sensation must be the less assumed the more uninhibited is the reflex act. Where the reflex act is inhibited from a superior centre, we shall have to suppose that the place where the sensation arises is also transferred to the superior centre; and in the case of a full-grown animal with a developed brain, perhaps definite and distinct sensation occurs only in the brain, while the sensory phenomena of the subordinate centres only contribute to the tuning of the

We see that we are here on the way to make Materialism for the first time consistent, and this, in fact, will be the

common feeling. This involves the uncommonly difficult question of consciousness, for obviously we cannot indicate any definite degree of a physical condition of excitation in any part of the central organs which would in itself and necessarily be connected with consciousness. Rather the passing of a condition of excitation into consciousness seems always to depend on a relation between the strength of all simultaneously present excitations in the seats of sensation. Precisely the same physical phenomenon might therefore occur with equal reflexive effect, at one time consciously, at another unconsciously. This is to be borne in mind for the doctrine of 'latent' or 'unconscious' ideas, as to which so much uncertainty has prevailed down to quite recent times. Here we have to do, of course, not with an "unconscious consciousness," but quite simply with an unconscious play of the same mechanism, which in another state of the collective condition is connected with the subjective effect of a particular idea. That there are latent ideas in this sense is the A B C of every empirical psychology, and it cannot escape on a careful examination that not only purposeful but conscious actions, but also phenomena of association of the most various kind result from this play of the same mechanism, which in another collective condition of the brain is connected with ideation.

Because of this unmistakable influence of the collective condition in the organically connected whole, we are also at one with Wundt that in the question of consciousness it is by no means indifferent whether a spinal centre is in connexion with the brain or is separated from it. (Comp. Physiol. Psychol., S. 714 f.) And we should be inclined also to argue that we must suppose a clearer consciousness in the spinal marrow of an animal which, in consequence of its organisation, possesses no cerebrum at all, than in the separated spine of an animal of higher organisation. Moreover, there is no doubt that the assumption of a consciousness in the separated centres of the second and third rank contributes nothing to the explanation of movements (Wundt, *loc. cit.* 829). On the other hand, we cannot agree with Wundt that the absence of any recollection and of anything resulting in spontaneous movement (S. 825 f.) in the decapitated frog is an argument against the real existence of consciousness. To all consciousness there appears, indeed, to belong, as Wundt too supposes, a synthesis; but this need not necessarily reach over a long period, and embrace different sensations in a unity. Even in the mere connexion of the newly arising state with the previous one, there lies a synthesis which makes consciousness logically intelligible. Sensation must refer to a change; that is sufficient. For the rest, let us repeat here that the question can never be to explain movements out of merely hypothetical partial consciousness, but the converse: from the peculiar combination of a more simple and intelligible mechanism with partial consciousness to explain how, in a much more complicated fashion, the whole can follow a strictly physiological mechanism and yet be at the same time the substratum of a manifold content of ideas. We must explain the engine out of its separate wheels, and attribute to the separate wheel, in addition to its other properties, a mysterious potency which belongs to it as part of the engine.

necessary condition of successful investigation into the relation of brain and soul, without Materialism being thereby justified in a metaphysical sense. If the brain can produce the whole spiritual life of man, we may well venture to credit a spinal centre with simple sensation. As to decapitated animals, let us remember how it used to be maintained against Descartes that the animals are not mere machines! Their sensations as such we cannot see; we only *infer* them from the signs of pain, pleasure, fright, anger, &c., which agree with the corresponding gestures in man. But in decapitated animals we find partly the same signs. We should conclude that they are equally connected with sensation. Animals from which the cerebrum has been removed scream or quiver if they are pinched. Flourens found fowls deprived of the brain reduced to a state of coma, and hence concluded that they do not feel. The same animals, however, could walk and stand. They wake if they are pushed, and rise if they are placed on their backs. Johannes Müller therefore rightly draws quite different conclusions: "Flourens concluded from his experiments that the cerebral hemispheres are alone the central organ of sensations. But this is not a legitimate inference from his highly interesting observations, which, in fact, as Cuvier has remarked, prove directly the contrary. An animal in which the cerebral hemispheres have been removed is in a state of stupor, but presents, nevertheless, manifest signs of sensibility, and not merely of the reflexion of impressions (reflex activity)." [28]

Müller himself fails only in holding apparently that the sensation of the animal deprived of its brain is much the same as the sensation of the uninjured animal. This is the result of Müller's complete entanglement in the theory of localisation. He regards the medulla oblongata as the centre of volitional influence; the cerebrum is the seat of ideas, and accordingly of thought. Thus he says, when speaking of the insensibility of the cerebral hemispheres: "That

[28] Handb. d. Phys., i. 845, E.T. i. 826.

part of the brain in which the sensations are converted into ideas and the ideas hoarded up, to appear again as it were as shadows of sensation, is itself devoid of sensibility." Of these remarkable processes, however, we know simply nothing. It is, moreover, very doubtful whether our so-called 'ideas' are anything else but complexes of very subtle sensations. Müller makes the medulla oblongata take care of will and sensation, requires the organs at the base of the brain specially for sensations of sense, and makes thinking take place in the cerebrum. There are accordingly again abstractions to which different provinces are assigned. The personification of the abstract is here not so striking as in phrenology, but it is there. If the reflexion of the inquirer were entirely directed to the phenomena of thinking, feeling, willing, his first thought would be to observe the overflowing of the excitation from one part of the brain to another, the progressive disengagement of tensive forces as the objective element of the psychical act, and not to seek after seats of the different forces, but after the paths of these currents, their relations and combinations.

Müller appeals to comparative anatomy to support his view of the cerebrum, that is, to the department which is still the most important, and almost the sole basis of this conception, since pathological anatomy has shown itself so refractory. It must, in fact, be admitted that the gradual development of the cerebral hemispheres in the animal world leads us to conclude with extreme probability that in this important organ must be sought the essential ground of the mental superiority of man. But it does not follow from this that it is also necessarily the seat of the higher intellectual activity. It is clear that here we have to make a considerable leap. But we will try to make the matter plain. A mill with a very large pool can work more regularly the whole summer through with the same and on the whole a moderate flow of water, than a mill with a very small pool or none at all. It can also, in case of need,

make a special effort without immediately exhausting itself, it is altogether more favourably placed and works to greater advantage. The pool is the reason of this advantage; yet the labour is not in the pool, but in the result of the outflow from it and its setting in motion an elaborate mechanism. As we wish here only to indicate the logical chasm, and not ourselves to set up a hypothesis, we add another illustration. Gutenberg's simple printing-press did little compared with our most complicated steam-presses. The superiority of the latter lies not in their form, but in their elaborate machinery; shall we thereupon assume that the printing is done in this machinery? We may, in fact, take our senses as an example. The more perfectly constructed eye determines better seeing, but the seeing takes place not in the eye, but in the brain. Thus, then, the question of the seat of the higher mental functions is at least open, if not altogether misstated; but that the cerebral hemispheres have a decisive import with regard to these functions may be at once admitted.

Müller believes too, it is true, that Flourens with his knife has given direct proof of the seat of the higher mental functions in the cerebrum. Büchner's phrase is well known, that Flourens has cut away 'the soul' from his fowl bit by bit. But even conceding that the higher mental functions of the fowl—functions so difficult to define—had really fallen away in these vivisections, even then the supposition does not follow, since the cerebrum need still be only a necessary factor in the production of these activities, but by no means their seat. But we must further observe that in the organic body the removal of an organ like the cerebrum cannot be effected without the animal's becoming unwell, and especially without the neighbouring parts being seriously disturbed in their functions. This is shown, *e.g.*, by an experiment of Hertwig's (in Müller), where a pigeon from which the upper portion of the hemispheres was removed could not hear for fifteen days, but at length recovered its hearing and so lived

for ten weeks. In Flourens' experiments the animals usually lost their sight as well as hearing, a circumstance which led this inquirer to believe that they no longer retained consciousness. Longet has proved, on the other hand, by a very remarkable experiment, that if the optic thalami and the other parts of the brain except the hemispheres are carefully spared, the sight of the pigeons partially remains. Suppose now we took and blinded the most brilliant writer, deprived him of hearing, disabled his tongue, and besides gave him a slight fever or a permanent intoxication. He must retain the cerebrum, and we are convinced that he will not exhibit many traces of his higher mental functions. How, then, can we expect it from the mutilated fowl?

The latest cerebral researches, of which we shall speak presently, secure the cerebrum its preponderant importance in quite another way. It appears here not as 'soul' or as an organ which in some unintelligible way produces 'intelligence' and 'will,' but as that organ which brings about the most complicated combinations of sensation and motion. Not 'will' as such is here produced, but an effect entirely analogous to reflex acts, only more manifoldly compounded and determined by more manifold impulses from other parts of the brain. The brain does not produce a psychological abstraction which would still have to transform itself into the concrete action; but there is concrete action, as in a reflex action, as the immediate consequence of the cerebral conditions and the conditions of excitation existing in the various paths. We do not, therefore, cut away the 'soul' of the fowl bit by bit, but the knife destroys a combining apparatus consisting merely of individual parts of the most various and decided import. The individual character of the creature, its animal peculiarity continues until the last trace of life disappears. But whether consciousness is exclusively attached to the functions of this apparatus is still very doubtful.*

* Comp. Note 27.

As an example of a one-sided and arbitrary philosophy of the brain, we may mention farther the views of Carus and Huschke, which in slight modifications have been widely spread, although they rest entirely on the principle of the personification of traditional abstractions. They carry us back indeed into the sphere of the Philosophy of Nature, without, however, too widely deviating from the present standpoint of science; for in the treatment of the brain we have hardly, even in the most recent period, passed beyond the Philosophy of Nature.

Huschke taught in a dissertation of 1821 that to the three vertebræ of the skull there correspond three main divisions of the brain, and that, therefore, we must also assume three main intellectual faculties—a curious causal connexion, but one quite in the modes of thought of the time. To the medulla oblongata and the cerebrum is assigned *willing*, to the parietal lobes *feeling*, and to the frontal lobes *thinking*. Of course 'polarity' plays a part in all this. The cerebellum is opposed in a polar way to the cerebrum; the former serves for motion, the latter for sensation and thinking; the former has active, the latter receptive activity. In this respect the parts of the bases of the brain are completely attached to the cerebrum; but then, again, within this mass there arises polar opposition. As assisting us to understand the mode of origin of scientific ideas, it will always be interesting to observe that Huschke regarded the famous experiments of Flourens, which were published some years later, as an experimental demonstration of his theory.[29]

Carus lately proposed a very similar trichotomy, but found the original seat of the soul in the corpora quadrigemina, while Huschke claims also the optic thalami, the posterior lobes of the cerebrum, and other portions. Huschke thinks the corpora quadrigemina too insignificant for so important a function as that of the life of the soul,

[29] Huschke, Schädel, Hirn u. Seele, Jena, 1854, S. 177 ff.

especially as they visibly lose in importance in the development of man, as well as in the ascending animal series. This circumstance does not disturb Carus, since he starts from the *original disposition*, and thinks it an absurdity to regard emotion, intelligence, and will as so localised in the developed mass that they would be, so to speak, "imprisoned each in one of the three divisions of the brain." But it must be very different "if we speak of the primary disposition of these structures, when as yet the conducting fibres are not developed, or only imperfectly so, and when, therefore, there can as yet be no question of the finer shades of intellectual life." Only, then, in this mere disposition to a later developed intellectual activity are its three main tendencies to be considered as localised. In so far as Carus conceives this whole localisation as at bottom only the symbol of the peculiar development of mind, his standpoint evades refutation by losing itself in metaphysical vagueness.

If we examine the proofs of the two physiologists whose views are so nearly related, we are met at once by that extended use of comparative anatomy in which from the outset the standpoint of the Philosophy of Nature is so remarkably fused with that of positive science. Because comparative anatomy rests upon the most precise apprehension of particulars, because it requires for its foundation the most exact operations, especially in the anatomy of the nervous system, inquirers only too easily transfer the feeling of their exactness to the conclusions which they think themselves bound to draw from the comparison of corresponding forms. Now, in all conclusions as to the relation of brain formations to mental activities, the procedure is by no means simple. We compare visible human organisms with those of animals. Good! This comparison admits of exact methods. We can weigh the corpora quadrigemina of a fish; we can reckon the proportion of the cerebellum in birds to the whole of the brain. We can compare this proportion with that which

we find in man. So far the way is smooth. But now in the same way I must know the mental functions of animals, compare these with each other and with the functions of man. Here begins the most difficult of tasks. For I must now, as it were, adapt striking similarities and differences of the one field to those of the other, compare the degree and regularity of the phenomena observed, gradually find a network of such correspondences, and thus become more certain of the individual facts. In this process I must avoid the illusions which our fertile imagination is ready to suggest to us in such numbers.

Yet, instead of accumulating difficulties, we will rather pointedly indicate the impossibility of the procedure. This lies in the want of a comparative psychology. In psychology we can undertake no dissections, can weigh and measure nothing, can exhibit no preparations. Names like thinking, feeling, willing are mere names. Who will point out exactly what corresponds to them? Shall we make definitions? A treacherous element! They are of no use, at least for any exact comparisons. And with what are we to connect our observations? With what measure shall we measure? In this groping in the dark it is only childish prejudice or the clairvoyant impulse of the metaphysician that is sure of finding anything. The understanding has only one way: it can only compare the positive, attested, observed actions of the animal world with their organs. It must resolve the question into the question of modes and causes of motion. This is a way yet to be trodden; for men like Scheitlin, Brehm, and other friends of the animal world, for all their services, can hardly be regarded as even pioneers in those things that we must possess before we can move with even moderate confidence among such comparisons.

What shall we say, then, if the larger size of the cerebellum in birds and mammals is attributed to their *motor* character as opposed to the more *receptive* nature of man?

It is clear that nothing at all can be learnt in this way.

An anatomist observes that in the sheep the anterior pair of the corpora quadrigemina is large, the posterior pair small; conversely in the dog. This leads him to the notion that the anterior pair is sensible, the posterior pair motor. Can such an idea do more than at the most serve as a direction-post for farther researches? These researches, however, must not consist in the accumulation of similar observations with the like arbitrary interpretation, but they must pass into a defined sphere which can be worked by means of experiment. Above all things, we must get rid of the general ideas of scholastic psychology! If any one shows me that a slight injury to some portion of the brain makes an otherwise healthy cat give up mousing, I will believe that we are in the right path of psychological discoveries. But even then I will not assume that the point has been found in which the ideas of mouse-hunting have their exclusive seat. If a clock strikes the hours wrongly because a wheel is injured, it does not follow from this that it was this wheel that struck the hours.

Above all, we must be clear that in all the paragraphs of the old scholastic psychology there is nowhere mention of things that we may ever expect to find again in the elements of the cerebral functions. It is with them much as if one tries to find the various activities of a locomotive, so far as they can be externally observed, localised in the individual steam-pipes or in particular parts of the machine. Here the faculty of expelling smoke, there a similar faculty for puffs of steam, here the turning power, there the faculty of running quickly or slowly, and elsewhere again the capacity for drawing burdens. In our whole traditional psychology the actions of men are classified, without any regard to the elements of their origin, according to certain relations to life and its aims, and indeed in such a way that the mere psychological analysis often shows clearly how little what is denoted by a single word forms a true unity. What is, for in-

stance, the 'courage' of the sailor in the storm, and then on the other hand in regard to supposed ghostly apparitions? What is 'memory,' what is 'ratiocination,' having regard to the various forms and spheres of their effects? Almost all these psychological notions give us a word by means of which a portion of the phenomena of human life is very imperfectly classified. With this classification is combined the metaphysical delusion of a common substantial basis of these phenomena, and this delusion must be destroyed.

How deeply the prejudice as to the localisation of the mental faculties may be rooted is shown by a still almost pathetic example from the life and activity of one of the earliest inquirers in this whole department. Flourens, who in the beginning of the 'twenties' gained a European reputation by his famous experiments in vivisection, returned forty years afterwards to the investigation of the functions of the brain, and applied a method which deserves admiration for its novelty and ingenuity. He applied small metal balls to the surface of the brain of animals and let them slowly sink through. The balls in every case forced their way in course of time right through to the base of the brain, without *any disturbance of function whatever resulting.* Only where the balls stood directly over the vital centre, death followed when they had sunk completely through. Flourens recounts these experiments in a dissertation on the curability of brain wounds (Compte Rendu, 62), which shows, moreover, that there are numerous cases of such lesions in which the individual sustained no hurt, and that, in fact, brain-wounds heal with surprising ease. And yet in the same dissertation Flourens still declares the division of the mental faculties in accordance with the organs of the brain to be the aim of science!

Only of late have we entered upon better paths, and small as the positive results may still be, there appears at once firm ground and a sure starting-point of investigation.

We must especially mention here the anatomical in-

quiries and theories of Meynert on the structure of the brain.[30] Meynert has undertaken the first thoroughgoing attempt, leaving aside all psychological views, to gain a collective view of the structure of the brain and the arrangement of its parts, and thus to determine the general course of all the cerebral functions, especially in regard to the possible modes of physiological phenomena. As a fixed starting-point in the latter regard he employs merely the well-known partly sensory, partly motory nature of the nerve-cords of the spinal marrow penetrating into the brain. These he follows up along their paths until he comes to the cerebral cortex, whose different regions there obtain one fixed character, and conversely backwards from the cerebral cortex through definite anatomically given steps to the spinal cord and the peripheral nerves.

The general picture resulting from this mode of consideration is, so far as we are here concerned, briefly as follows. The nerve-paths multiply as they mount towards the cortex of the cerebrum, and simplify in their descending course. The sites of this multiplication are organs of the grey substance, that is, meeting-points of ganglion cells, which are traversed by the white substance of the conducting fibres. In the same organs takes place an extremely manifold combination of conducting paths. The grey substance, which undoubtedly effects these junctions and ramifications, separates from the standpoint of this classification as it were into three categories: the first forms the cerebral cortex, the grey substance of the first degree; then follow the great ganglia at the base of the brain as grey substance of the second degree; and, finally, the central grey substance of the cavities as third stage. Besides this, there is of course too the grey substance of the cerebellum, which is an organ of a specially rich and manifold complication of sensory and motory paths.

[30] Comp. chiefly Meynert, Vom Gehirne d. Säugeth. in Stricker's Hdb. d. Lehre v. d. Geweben, Leipz. 1871, S. 694 ff., E. T. ii. 367 ff.

Meynert makes this, for simplicity's sake, into a fourth class of grey substance, which does not, however, belong to this procession of classes, but has a separate position most akin to the organs of the second order.

The conducting fibres (white substance) Meynert classes summarily into the system of association and of projection. The fibres of the former serve to connect the different portions of the cortex; those of the latter maintain intercourse between the cortex of the cerebrum and the external world, which projects itself, as it were, by means of the nerves in the hemisphere of the cortex. This conception of the projection of the external world in the cortex might indeed be regarded as a disturbing psychological addition, but it is so generally held, that it may, in fact, be separated from the apparently necessary consequence that consciousness is a function of the cortex. At bottom, we may say that the outer world projects itself in every nerve-centre; in the rudest, simplest form in the grey matter of the spine and brain-cavities; more perfectly in the great ganglia, and finally, in the most perfect and peculiarly human way in the cerebral cortex. In all this there is to be observed a certain succession of classes. The grey matter of the third class brings about reflex acts. These may be inhibited from certain points of the second class; the impression received does not act again immediately outwards, but it is taken up in a more complicated psychical image, or it is sometimes as it were stored up for the production of a state of excitation. But the organs of the second rank are at least partially themselves again of a reflex nature. They are the more compound reflex acts, directed towards a vital end, that are here formed. A stimulus arriving here, according to its nature and to the state of the centre, sometimes causes no movement at all, sometimes causes, perhaps, a whole series of simultaneous or even successive movements.

But these reflex acts of the second class may again be inhibited and modified by the intervention of the third

and highest kind, the cerebral cortex. Here, it is said, it is conscious will that interferes, and yet the apparatus, the results of the function, are of the same kind as in the second class, only again much more manifold and developed. Conscious will itself seems, therefore, to exhibit itself physiologically only as the highest kind of reflex action, which, be it said in passing, does not affect either its consciousness or its ethical dignity as 'will.' Our psychical functions remain what they are, even though we have before us in their physiological manifestation nothing but an extremely perfect mechanism, which in its complexity far surpasses our power of mathematical apprehension.

We have wandered a little from the exposition of Meynert's theory. He confines himself strictly to exhibiting the morphological organisation of the brain; but it is just the greatest advantage of a really luminous and orderly morphology that it immediately gives to us also an insight into functions. This becomes still more evident when we follow somewhat more particularly the course of the nervous processes.

The projection system has, that is to say, a double path. The one leads from the cerebral cortex through the crusta of the cerebral peduncle to the spinal cord, the other through the tegmentum of the peduncle. In the former path the second class is chiefly represented by the nucleus caudatus and the nucleus lenticularis; in the latter by the optic thalami, the corpora quadrigemina, and the inner corpus geniculatum; the former is purely motor, the latter mixed. The path of the crusta of the peduncle grows together with the nuclei enclosed in it, as we mount in the animal series, proportionally with the development of the hemispheres of the cerebrum. In man the crusta of the peduncle and nucleus lenticularis are very strongly developed; the height of the crusta of the peduncle equals the height of the tegmentum, while, *e.g.*, in the roe its proportion is one to five. We must conclude from this that the forms

of movement and sense impressions which are most indispensable for animal life are conducted and collected on the path of the tegmentum. The great nuclei imbedded here are also pre-eminently the seats where compound reflex actions are formed, which, as it seems, are only inhibited, strengthened and generally regulated from the cortex. In the path of the crusta of the peduncle, on the contrary, such movements appear to be especially conducted, the combination of which takes place in the cerebral cortex itself.

It might surprise us that it is just a motor path whose higher development runs parallel with the increase of the hemispheres and attains its maximum in man. Are not many animals superior to man in the grace and quickness of their movements? Does not, *e.g.*, the gibbon sporting in the boughs laugh to scorn all the gymnastic feats of which man is capable? Are we not, on the other hand, superior to the animals in the strength and variety of our sensations? Do not our scientific perceptions demand an exercise of the senses which is unknown to the animals? Nay, since all consciousness is ultimately based upon sensations, should we not expect that a relatively higher development of the sensory paths must go hand in hand with the development of intellectual life?

In answer, we must take into consideration speech and the skilful hand of man in their import for the intellectual life. As to speech, we already know in fact the part of the cerebral cortex in which sounds are combined into significant words; and of all the phenomena of mental disturbance none is at present nearer to being understood than aphasia. But speech as well as manual skill show us that the most important points are not the strength and swiftness of movements, but complexity and nicely calculated purpose. But for this there is required an extensive co-ordinating apparatus with connexions which run from any point of a given system into a multiplicity of points in other systems. In speech it is not only neces-

sary to measure nicely the pressure of the lips which produces a *b* or a *p*, or to make the movements of the organs which form a word of difficult pronunciation follow each other fluently. Speech must also mean something; and therefore from the place where the word is combined, there must run again manifold connexions to the places where sense-impressions are combined. These connexions can in part hardly be otherwise conceived than that each definite sensation or definite impulse towards muscular movement finds itself represented in a whole series of cells in the cerebral cortex, each of which again has its special connexions. As in the apparatus of Corti in the snail a whole series of nerves lie ready to receive impressions, very few of which, however, are required for the conducting of a particular sound; so we must conceive that in the nerve-centres also, and especially in those of the higher kinds, a stimulus arriving is received by many cells, in only a few of which the phenomenon of excitation receives an immediate psychical import; just in the same way that a motor impulse, calculated to set a group of muscles in motion, may proceed from many brain-cells, while their connexions with other parts of the brain determine whether the impulse is really given or not. It is true that we shall seek in vain for an apparatus in the brain that regulates this choice of activity so simply as the vibrations of the membrana basilaris regulate the activity of the auditory nerves in the snail. But as soon as we suppose that the conducting or non-conducting of the nerve-processes is determined by nothing so much as by the state of excitation in the fibres and cells which already exists, and is also determined by the accessory conductions, we need seek no further mechanism as a sort of switching-place on the lines of conduction. The regulating principle is given.

As to the control of the human hand, we must not only, because of its great mobility and adaptability for the most ingenious uses, assume for the motory portions of the

brain a rich development of the combining apparatus, but we must also take into account writing, for example, which stands in very intimate relation with speech. If we then think farther of the achievements of a pianist, a painter, a surgeon, &c., in which the nicest adjustment of motor impulses co-operates with the most manifold combinations, the need of a great extension of the motor apparatus of the brain for human activities will become clear. To this we must add the mobility of the features and the extraordinary significance of the movements of the eyes, which play a very essential part in the formation of visual images and in the apprehension of delicate relations. The training of the senses for scientific perceptions also makes demands upon the motory apparatus. Sight is most closely connected with the activity of the muscles of the eye, touch with the muscular sense of the hand. But even in general bodily movement, man, despite all the gymnastic performances of the apes, is far superior to the animals in variety and nicety of attitudes and movements. Nor need we point here to the performances of dancers, of Japanese jugglers, or of pantomimists. Walking, the upright position, the free movement of the arms, lead to a quantity of movements which we regard immediately as the expression of mind, and in which even the awkwardest man announces his character by a strictly adapted conformation. But even amongst sensations, those of the muscular sense (let us only recall speech, the features, ocular movements) are perhaps just the most important, whether they have their seat directly in the motor apparatus or depend upon its activity.

Meantime physiology, too, has not been idle, and has taught us that the processes in all nerves in the condition of excitation are essentially the same.[31] There is not a special nervous process of sensation and another of motion, but the physical process is in all cases of the

[31] Comp. Hermann, Grundr. der Physiol., 4 Aufl., S. 316 f.; Wundt, Physiol. Psych., S. 104, *et saep.*

excitation of a nerve essentially the same, and differs only in strength or weakness, quickness or slowness, &c. Moreover, each fibre irritated in any part of its course conducts centrifugally as well as centripetally; only that in the sensory fibres the former, in the motory fibres the latter, conduction passes off without effect. We have here, therefore, a perfectly certain case of the principle that a conduction propagating itself in more ways than one nevertheless attains a result in only one of its paths, and there is nothing to prevent us from applying this principle in the widest extent to the functions of the brain.[32]

Finally, direct experiment also has done its part. The experiments of Hitzig and Nothnagel in Germany and of Ferrier in England have shown that the cortex of the anterior cerebral lobes influences particular movements. A rabbit, *e.g.*, whose forefoot is affected by the destruction of a particular small portion of the cortex, is not exactly paralysed; it may still continue to carry out even combined movements, as they are probably formed in the nerve-centres; but it is uncertain, it sets its foot down awry, allows the affected part to be placed in another position without resistance, and seems to have no distinct consciousness of the position of this limb; and even though the animal finally succumbs to the cerebral injury, yet a period of six to ten days, if the creature lives so long, suffices to remove again the perturbation of movement. How is this to be explained? One of the projectors of these experiments, Nothnagel, believes that we have, as it were, a 'partial paralysis of the muscular sense,' but that it is not the ultimate centre, the real 'terminus' which is injured, but only a station on the line, and therefore other paths may open themselves again for

[32] Here then exists the very important principle that a weak state of irritation already existing in a nerve at the same time increases the irritability of the nerve by a fresh stimulus. Comp. Hermann, Physiol., 4 Aufl., S. 323. This connexion especially throws a clear light upon the association of ideas.

the same function.[33] On injuring a neighbouring spot, the 'muscular sense' did not show itself affected, but there appeared a certain deflexion in the placing of the foot; this perturbation also gradually disappears again. Here Nothnagel assumes a station for the exciting will-impulse, but again supposes it not to be the terminus. "The *restitutio in integrum* compels us to the conclusion that here only a path is interrupted; that the part of the brain cannot be eliminated where alone the will-impulse passes to the nerve-fibres; that is where alone the will-impulse is formed. If a restoration is possible, then other paths must act vicariously, or at least the capacity to produce the will-impulse must inhere in other places." The experiments when the corresponding places in both hemispheres were destroyed did not succeed. It remained, therefore, doubtful whether the gradual restoration of the functions is effected by the intervention of the other hemisphere, or by the arising of new paths in the same hemisphere. In any case, the reporter believes himself authorised to conclude, "even if it were at all possible that a circumscribed spot, in which psychical functions would arise, should after its elimination be replaced by another, we must yet come to the conclusion that there is no rigid localisation of the mental functions in particular centres of the cerebral cortex."[34]

Let us next occupy ourselves a moment with the premiss, that is, with the recurring axiom—only a mediating, transmitting region can be replaced after its destruction; if the original organ of a psychical function is destroyed, a substitute for it is inconceivable.

Why? Is it because with the destruction of the psychical faculty its impulse to express itself also disappears, and therefore the occasion for a new formation? That would end in a dualism which it were impossible to reconcile with the principle of the conservation of energy. Or is it because the psychical function is something absolutely

[33] In Virchow's Archiv, Bd. lvii., S. 196 f. [34] Loc. cit., 201, 205.

original, which cannot be reproduced by the organic connexion with corresponding, perhaps subordinate, functions of the neighbouring parts? That would be a quite new principle, which attributes to the intellectual rank of phenomena a physiological influence which nowhere shows itself, and which, in fact, contradicts every principle of physiological inquiry. We see, therefore, in the scruples of the reporter merely an effect of the old theory of mental faculties which so long rendered the study of the brain fruitless. If the 'muscular sense' or the 'will-impulse' is hypostasized in the sense of this old psychology as a 'faculty,' which is served by a greater or lesser portion of the brain, then on the materialistic view the 'faculty of the soul' is destroyed together with the corresponding part of the brain; on the dualistic view its indispensable instrument is destroyed, and then, indeed, we cannot see where the impulse is to come from that is to take its place. If, on the contrary, we keep strictly in view that from the standpoint of physiology, even in the production of a conscious impulse of will, we have to do with an organic process like every other, that the 'faculty' of psychology is only a name, with which the possibility of the process is apparently elevated to a special thing, that finally the inquiry into the intellectual classification of the functions has nothing at all to do with physiology; then we cannot at all see why even the 'terminus' of a psychical line or the place of origin of a 'faculty,' like any other part of the brain, may not be replaced in its activity by new lines.

Here on the ground of the old psychology yet another consideration might arise, that is strange enough, but yet deserves mention, because prejudices of this kind must be followed to their last retreat. We might, that is to say, demur that the will-impulse to move a particular part of the body is destroyed, while the mastery of the will over the other parts continues. The will itself, which is a whole, seems thus to be merely a sum of partial functions.

But why not? we must ask again: for, to begin with, we know nothing but that certain actions of the creature disappear and again appear, when a certain portion of the brain is injured. These actions are of the kind in which the causal connexion is most complicated, and which we attribute to a 'will.' But what do we know of this will? Apart from the inventions of the psychologists absolutely nothing but what is contained in the facts, in the manifestations of life. If in a certain sense we speak rightly of a unity in the will, this is merely general unity of character, of mode and manner. But this general unity also belongs to the sum of the particular manifestations of life, and at bottom only to this. When we speak in this of 'will,' we only add a comprehensive word for a group of vital phenomena. Every supposition of a thing for a name is to exceed the facts given us, and is, therefore, scientifically worthless.

Now we shall be able to see too whether we are to expect or not a "rigid localisation of the mental functions in particular centres of the cerebral cortex." Nothnagel is here quite right; his experiments are opposed to such a rigid localisation, even if the restoration of the functions could be explained by the intervention of the other hemisphere. For even the will-impulse proceeds after this process of restoration from another point than before. But the will-impulse, and even the will-impulse to move a particular member, is again merely a name for a sum of functions, which has a definite external result. The elementary functions of the single cells and threads may withal be very strictly localised, and yet it is conceivable that the same result under special circumstances may be attained by another road. But so soon as we see again the same result, we say, in accordance with ordinary psychological notions, "The will-impulse is restored." What was destroyed, however, is by no means restored, but merely the same product by means of quite different factors.

To be clear as to this is of the utmost importance; for it is very probable that the most manifold substitutions of this kind only occur when we come to the highest mental functions of man. He who, for instance, is accustomed to think more in notions than in sensible images will probably have his thinking at first very much hindered by an attack of aphasia, until he succeeds in completing the transition from the premiss to the conclusion in mere intuition, and so reaching the same goal which he formerly reached only through "dumb speech." It is very probable that the participation of different regions of the brain in thinking is very different, even in healthy individuals, while the result, the thought, remains the same.

While Nothnagel concluded from his experiments that the psychical functions in the brain are *not* localised, Hitzig, on the contrary, concludes "that certain particular psychical functions, probably all, at their entrance into matter or at their origin, are assigned to circumscribed centres of the cerebral cortex."[35] The opposition between the views of the two inquirers is not so great as it appears, for Hitzig is free from the old psychological conceptions, and by "psychical functions" understands not hypostasized words, but—since we have to do with the functions of the simplest possible parts of the brain—really simple psychical phenomena, and simplicity is here to be gained only by most strictly keeping to the corresponding physical fact. The will to bend or stretch this particular member is quite simply and naturally transferred to that point of the cerebral cortex, through the electrical stimulation of which the movement in question is excited. In this respect the pioneering experiments of Hitzig are made with such delicacy, that he succeeds in resolving the physical phenomenon into finer elements than in a certain sense exist for the psychical phenomenon. When, *e.g.*, from a particular point of the cortex, one ear, and only this, is set into violent movement, it is fair to ask

[35] Untersuchungen über d. Gehirn, Berl. 1874, S. 31, 56.

whether the will can ever produce so definite a partial effect. It need not do so, since it serves no object involving life. The delicacy of the psychical functions consists again in other points in which of course no physiological experiment can approach even afar off; above all, in the incredibly sharply defined intensity of every excitation and the exact measure of the corresponding movement; then also in the combination of different muscular activities into a collective movement of adaptation. Here again let us only recall the performances of the human hand, of the tongue, of the facial muscles in mimic expression, and we shall easily see where the intellectual element lies. We find it everywhere in measure, in form, in the relation of the co-operation of the physical functions, where the smallest feature, especially in artistic treatment, attains the highest importance. From the purely physical side of the process, however, the elements of these most delicate mixtures of various impulses can be shown to us isolated in a way which is impossible for the will.

It is not uninteresting that Ferrier,[63] in his crude and unmethodical repetitions of Hitzig's experiments, came much oftener than the latter upon the origin of complete purposeful movements, whose origin he attributed to the stimulation of a particular portion of the brain. By the use of too strong currents he had irritated also neighbouring parts, and as, *e.g.*, the centres for bending, stretching, the adduction and rotation of a limb, all lie near to one another, it is very natural that a simultaneous irritation of several centres may produce in their collective action, *e.g.*, a running movement, or in a cat the movement of scratching. Hitzig's experiments with their exacter isolation are physiologically incomparably more valuable; but for psychology it would be of special interest to see how the adapted

[63] Ferrier describes his investigations in the West Riding Lunatic Asylum Reports for 1873; there is a short notice in the 'Academy,' Nov. 1, 1873. Comp. the criticism of Hitzig, *loc. cit.*, S. 63–113.

movements might be made to arise artificially and with exacter calculation of the individual impulses. It is, moreover, not improbable that in the deeper lying layers of the cerebral cortex there are cells, by exciting which a whole series of points lying on the surface may be secondarily excited at the same time, and in a definitely regulated manner. But in whatever the co-ordinative mechanism may consist that unites a group of elementary effects into one purposeful activity, in any case we have good ground to assign to the idea of this purposeful activity and to the will to call it forth no other seat than that part of the cerebral cortex in which this activity itself has its origin.

This must be quite otherwise if we had an immediate consciousness—a consciousness to be ranked with sensation in the widest sense of the word—of our own muscular activity. We should then have to suppose that somewhere in a sensory centre the idea of the action in question was formed, and that from here a transmission was propagated into the mechanism of the motory system; but in all probability both kinds of 'idea' must be assumed side by side in order to satisfy the requirements of a rational psychology. The idea of an action, *e.g.*, of running, as it might be formed in a sensory centre, can, it is probable, from its originating from pictures of objects, never be quite the same as the idea which is produced from its own activity. At the same time both may perform the same service in a train of thought. Thus, *e.g.*, in following a narrative, we may develop the images excited in us calmly and objectively; but if we are more affected by it, we put ourselves into the place of the person engaged, and then every one may observe in himself how the idea of a blow is often connected with a twitching sensation in the arm, the idea of a leap with an inclination to spring. In man speech appears furthermore as the most important focus of ideas, and here it can hardly be doubted that the idea of the word has its seat where the word is produced. Our thinking, it has often been observed, is a gentle, and, as it were,

internal speaking. But careful observation shows us very easily that there are very frequently, and in case of great emotion always, actual impulses in the vocal organs connected with this 'internal' speaking.

All this might also be the effect of 'association,' but association itself can hardly be brought into harmony with the facts of physiology, except by referring it, on the one hand, to the existence of the most manifold conductions, but, on the other hand, to the partial identity of the sphere of excitation.

The facts of mnemonics show that from the idea of 'castle' the transition is very easy to 'wall' or 'tower,' but just as easy to 'mountain,' 'nobility,' 'middle ages,' 'estate,' 'Rhine,' &c. Especially easy, too, is the transition to mere homonyms, as, *e.g.*, from the habitable castle (Schloss) to the 'lock' (Schloss) of the door, the 'key' (Schlüssel), 'locksmith' (Schlosser), and so on.

On the association theory of last century all the individual fibres, which were conceived as the bearers of such ideas, must lie in close connexion with each other, in order that the vibration might pass from one to the other. Yet here we come upon the most obvious impossibility, especially if we think of the simple and easily repeated feat of the teachers of mnemonics, which consists in linking together the most heterogeneous ideas that can be suggested to them by the interposition of one, or at most two connecting words. Everything must lie close together. If, however, we assume extended spheres of excitation for an idea, and besides the proper connexions from the purely objective image of the idea to the motory foci of excitation connected with it, and again to the speech-centre of the corresponding word, we shall be easily led to assume for related ideas a partial identity of the sphere of excitation.

It will always be of service, in order to avoid a relapse into the old psychological ideas and to assist the right view to come to the front, if it is shown how even the complex psychical images can be explained from those

simple beginnings with which exact research is now concerning itself. For the rest, we must entirely approve the reserve with which Hitzig thinks himself bound to refrain from all ulterior speculations on the activity of the brain and mind. The inquirer who has once trodden the right path is more surely led by the narrowly defined, but at the same time significant results of his labour, than by prematurely developed theories, and at the same time he must surely and strongly influence his colleagues by the mere example of his labour. Hitzig quotes a saying of Fechner to the effect that the safety, fruitfulness, and depth of a general conception depend not upon the general, but the elementary in it.[37] Everything depends only upon our certainly apprehending what is the elementary, and it is then an enormous stride in investigations into the brain and the psychical functions if it is once generally recognised that the elementary in psychical functions can be nothing else than the physiologically elementary. In this way, too, Materialism in this sphere has become a good deal more consistent, and accordingly brought near its end also; for its consistency is its destruction.

We possess now, too, at length, in Wundt's admirable 'Principles of Physiological Psychology' a work which has already made the new and only fruitful views the basis of a comprehensive treatment of the psychological sphere. Let us hear how Wundt deals with the decisive point.

"We can conceive that a particular nerve-fibre or a particular ganglion-cell operates only in the form of the sensation of light or of a motor impulse, but not how it is that certain central elements are supposed to serve the imagination and others the understanding. Apparently the contradiction here lies in this, that we conceive complex functions attached to simple forms. But we must necessarily assume that elementary forms are also capable of elementary performances only; and such elementary

[37] Hitzig, *loc.cit.*, S. 52; comp. Fechner, Elemente d. Psychophysik, i. S. 7.

performances, in the sphere of the central functions, are sensations, impulses of movement, but not imagination, memory, &c." "Everything," observes Wundt farther on, "that we call will and intelligence resolves itself, as soon as it is traced back to its physiological elements, into nothing but sentient impressions transforming themselves into movements."[38]

What will become, then, of the 'unity of thought,' if the individual idea is something so uncommonly complex? Just what becomes of the unity of an artistically constructed building when we consider its composition from individual stones. It is a *formal* unity, which may very well exist along with the composite nature of the material in which it is realised. But as to this material and its elements—sensation and the consciousness of motor impulses—we must carry out, in the strictest sense of the word, the law of the conservation of energy. This is the road to that consistent Materialism which leads us immediately to the 'limits of natural knowledge.'

Let us try to apply consistent Materialism in a particular example.[39]

[38] Op. cit., Leipz. 1873, S. 226, 228.

[39] The example here given might perhaps have been dropped in the second edition, if a highly characteristic misunderstanding had not shown me that such illustrations are not only necessary for many readers, but that, where it is possible, a commentary should be added to them, and that for those in whom we would expect a better understanding. Professor R. Seydel, in a lecture entitled 'Widerlegung des Materialismus u. der Mechanischen Weltanschauung,' Berl., 1873, has dealt at length with our example, and with an astonishing naïveté has treated the main point, for the sake of which alone the example was taken, as an obvious "oversight"! He says (S. 17): "Here now Lange is guilty of an oversight, which we must not attribute to the mechanical theory as such. It is, of course, obvious enough that the telegram, as a physical object—*i.e.*, paper, pencil, and light waves—could not be taken up into this causal series. What has been the causal element in the merchant's springing up is obviously only the *content* of the message, that is, not what the telegram was, but what it imported. This is so obvious," &c. Here I really cannot help expressing the wish that even among the 'philosophers' it may at last become usual to learn something reasonable about things before venturing to talk of them. Any one who has the most superficial notion of the consecution of a physical causal series, to say nothing of the law of the conservation of energy, must know that here 'paper, pencil, and light-waves' do, in fact, belong to the

A merchant sits comfortably in his easy-chair and does not know himself whether the greater part of his ego is occupied with smoking, dozing, reading the paper, or digestion. The servant enters, bringing a telegram, "Antwerp! Jonas & Co. failed."—"Let Jacob put the horses to!" The servant flies. The master jumps up, completely sobered: some dozen steps through the room—down into his counting-house—gives instructions—dictates letters—despatches telegrams—then enters his carriage. The horses pant; he is at the bank, on the Exchange, amongst his business friends: before an hour is over he is at home, throwing himself again into his chair with a sigh. "Thank heaven, I have provided against the worst! Now I must think further!"

A splendid chance for a psychological picture! Alarm, hope, feeling, calculation, ruin and victory crowded into

causal series; and whoever carefully follows the course of my exposition must see very well also that I have chosen this example at all only for the sake of its paradoxical appearance. I wanted to force the thinking reader for once to realise the mechanical theory in its full consequences, and this must also be the case with all those who have at least so much physical knowledge as to know that 'content' and 'meaning' are not forces which pass over from the message into me, but that they only originate within me. Nothing comes into me but these light-waves, and now the question is simply whether we will draw the consequences of the mechanical theory or not. We must know whether we say yes or no to the question which Hermann (Physiol., 4 Aufl., S. 459) has formulated with exemplary clearness, "whether precisely the same concatenation of centripetal impressions in the same organism would not always have precisely the same effect (the same apparently voluntary movement)." We must know whether, with Helmholtz (Pop. Vortr., 2 Heft, S. 200), we consider the law of the conservation of force to be valid for living creatures also, or not.

Of course there are plenty of easy-going Materialists who have never fully realised these logical consequences, and who are by no means disinclined, in the case of such an example as ours, also to take refuge in phrases about 'content' and 'meaning,' but then they are just the people who have never learned anything properly. But there are again thorough inquirers and keen minds who shrink from this extreme, and become confused over the validity of the law of the conservation of force in the case of man. A popular 'refutation of Materialism' might therefore plausibly rest itself upon an example somewhat as follows: 'If the mechanical theory is true, the whole of the effect here resulting must have proceeded from the light-waves penetrating to the eye, combined with the elastic forces already present in the brain. But this is incredible, therefore, &c. In fact,

an instant, and all excited by a single idea. What does not human consciousness embrace?

Gently! Let us consider the man as an object of the corporeal world. He jumps up. Why does he jump up? His muscles contracted accordingly. But why was this? They were struck by an impulse of nervous activity, which released the stored-up supply of tensive forces. Whence came this impulse? From the centre of the nervous system. How did it originate there? Through the—'soul.' The curtain falls: the *salto mortale* from science to mythology is accomplished.

But we wanted a logical Materialism. The soul is the brain! From the brain then. If now we stop here, the thing is precisely as mythical as before. It all avails nothing. We must follow back the physical causal series, without any regard to what we call consciousness, right through the brain till we come to the first occasion of the whole sudden movement. Or shall we take the opposite

however, the incredibility is by no means so great if we take into account also the principles of physiological psychology. We have before us not merely 'light-waves' in general, but particular forms and combinations of letters. The series of these impressions in reading acts partly through the optic nerves, but partly through the motor centre of the ocular muscles by means of the fibres of the association system primarily upon the centre of speech. Here, now, are released words of much 'meaning.' What does that mean, physiologically speaking? Nothing but that a group of cells and nerves is excited, which possesses unusually numerous and powerful conductions to other parts of the cerebral cortex. A very lively process of 'association' of ideas spreads itself and sets the whole brain in a state of lively excitement, while 'unimportant' words, *i.e.*, such as have slight or no old and powerfully conducting communications to other parts of the brain, cannot do this. The effect of the jumping up, &c., results then through the well-known 'teleological' mechanism, which we see at work even in the decapitated frog.

We do not give here, of course, an 'explanation' of the physical process, but merely the suggestion of the possibility of an explanation for those readers who, with Seydel, may think it "obvious" that the thing is otherwise. The true foundation of the principle of the conservation of force is, according to an everywhere consistently applied view, its axiomatic nature as the principle of the interconnection of the phenomenal world. The 'refutation of Materialism,' however, is partly to be drawn from the deeper sources of the theory of knowlege, and partly is found with regard to our illustrations in the remarks which we have made above upon Du Bois-Reymond's 'Limits of the Knowledge of Nature;' comp. especially vol. ii. p. 314 ff.

direction—what entered into the man? The image of a few lines in blue on a white ground. Certain light-rays struck the retina, which do not develop more living force in their vibrations than any other light-rays. The living force for the transmitting process is ready prepared in the nerve, as that of muscular contraction in the muscles; it can only be set free by the infinitely feeble impulse of the light-wave, as the elastic forces of a barrel of powder by the glimmering spark. But how comes it now that precisely these lines in this man produce precisely this effect? Every answer which appeals to 'ideas' and so on is simply no answer at all. I wish to see the transmission, the paths of the living force, their extent, the mode of propagation and the sources of the physical and chemical processes from which the nerve-impulses proceed, which bring into activity, first, the *musculus psoas*, then the *rectus femoris*, the *vasti* and the whole co-operative society, to effect the act of jumping up. I wish to see the incomparably more important nerve-currents which propagate themselves into the organs of speech, the respiratory muscles, produce command, word, and cry, which by the way of sound-waves and the auditory nerves of other individuals repeat the same play tenfold. I will, in a word, give up for the present the so-called psychical action to scholastic pedantry, and will have the physical action which I see explained by *physical causes*.

The reader will not suppose that I am summoning up impossibilities only in order to invoke at last a *Deus ex machina*. I proceed from the principle that man is throughout thoroughly intelligible, and I am content though we cannot at once explain the whole. As to the palæontologist the solitary maxilla from the Somme valley represents an entire race of primeval men with all its generations, so I will be content if the connexion between the first impression of the light-wave and the motory impulses connected with the more exact reading of the letters is

only made to me as clear as is the reflex movement in the twitching of a frog's thigh. Instead of that, people grope in the brain for 'thinking,' 'feeling,' and 'willing,' as though they would discover in the muscles of the under-arm of a pianist sharp, flat, allegro, adagio, and fortissimo, each in its own particular corner!

It will be long, of course, before the only just dawning rational treatment of cerebral physiology can answer these questions: nay, in a certain sense we are only just beginning to see the endlessness of the problems that here pile themselves together. Ancient Materialism and the Idealism of ancient metaphysic solve these riddles with equal facility by mere phrases; for whether I suppose an immaterial soul, and simply attribute to it as many 'faculties' as I need to explain the phenomena, or whether I make the same 'faculties' a function of matter, is quite indifferent as regards the question whether we have a phrase or real insight. The word which veils the phenomenon instead of explaining it in both places takes the place of the physical problem. We may, therefore, shortsightedly abuse the mechanical theory of things as we will; it has nevertheless the grand merit that at the same moment it lets us look into an infinity of problems, while it affords us a first small victory as a pledge that we are on the right path.

I am told, 'But fear, hope, zeal in your merchant are surely something too; the man *feels* something. Has this no cause?' In fact, we had almost forgotten the *nervus sympathicus*, the influence of the *nervus vagus* on the heart's movements, and all the numerous effects radiating through the whole body of the revolution going on in the brain, when so slight an impulse from the outer world throws the man into the liveliest agitation. We must learn these currents, too, before we announce ourselves content. We must know as exactly as possible how the numerous sensations, now strong now vanishing, which one feels in the tongue, another in the epigastric region, one in the calf,

another in the back, arise; whether merely in the central part or through a circuit of centrifugal and centripetal conductions. That this circuit plays a great part in all sensations is certainly shown by innumerable phenomena.

Czolbe was especially criticised by his opponents because he required for the development of self-consciousness a movement of the nervous fluid returning upon itself, which he made to proceed in the individual ganglion-cells. The fact has always struck me that the really occurring circuit of nervous activity which has so great a share in all sensations has hitherto been almost entirely neglected. On every lively excitation of cerebral activity there runs a stream of positive or negative effects by means of the vegetative and motory nerves through the whole body, and only when, by means of the sensible nerves, we receive the reactions from the changes thus produced in our organism do we 'feel' our own emotion. Whether now the subjective condition which we name sensation is connected with this whole circuit, or with the conditions of tension which arise after its completion in the central organ, or with other simultaneously arising movements and tensive conditions within the central organs, we leave undetermined; if only we might have these tensive conditions demonstrated to us and the rules of this circuit with all its million-fold various combinations revealed.

It is objected that in the consideration of mere symptoms we lose the thing itself. Yes, if any one could show us that after the elimination of all the symptoms that we could consider there is anything at all left! Let us make it clear to ourselves what there is besides to look for behind the nerve currents and tensive conditions of the act of sensation. This is either the subjective state of the sentient person, or the intellectual value of the content of the sensation. With the former, of course, no one will ever make acquaintance except in himself; and in the numerous discussions of Vogt's famous urine illustration it has

become clear enough that we cannot regard the 'thought' as a separate product in addition to the material phenomena, but that the subjective state of the sentient individual is at the same time to external observation an objective one, a molecular movement. This objective state must, on the law of the conservation of energy, fit into the unbroken causal series. Let this series be fully exhibited to us! This must be possible, without any regard to the subjective state, as this is not a special link in the chain of organic phenomena, but as it were merely the aspect of some of these phenomena from another side. We stumble here, indeed, upon a limit to Materialism, but only in carrying it out with the most rigid consistency. We are, in fact, of opinion that there is hardly anything to look for in sensation over and above the nerve processes above spoken of; only these processes have themselves a quite different mode of appearing, namely, that which the individual calls sensation. It is quite conceivable that some time we shall succeed in determining more precisely that portion of the physical processes which coincides in point of time with the origin of a sensation in the individual. This would be extremely interesting, and we certainly could offer no objection if this particular portion of the circuit of nerve processes were then described absolutely as 'the sensation.' A more exact definition of the relation of the subjective phenomenon of sensation to the objectively observed nervous phenomenon would, on the contrary, be impossible.

But now, as to the intellectual value of the content of sensation, this, too, can hardly be completely separated from the physical phenomenon. A masterpiece of sculpture and a rough copy of it present to the retina of the observer a similar crowd of light-stimuli; but so soon as the eye follows the lines, there arise in the muscles of the eye quite different sensations of movement. That these continue to act not according to the absolute mass of the movement, but according to the most delicate numerical

relations between the individual motory impulses cannot appear unnatural if we reflect what a part is played by numerical relations even in the first forming of sensations. It is true, indeed, that this very point will be one of the last and most difficult riddles of nature, but we have not the slightest occasion, therefore, to seek for that which is intellectually significant, the artistically moulded sensation or the ingenious thought, outside the ordinary processes of sensation. Only, of course, let us not proceed like a man who should try to discover the melodies that an organ can play in the individual pipes.

The co-operation of very many, and, individually considered, extraordinarily feeble nerve impulses, must give us the key to the physiological understanding of thinking, and the form of this co-operation is the characteristic feature of each individual function. What in this remains unexplained—the manner, the external, natural phenomenon—is at the same time an internal one for the thinking subject: that is the point which altogether overpasses the limits of the knowledge of nature.

CHAPTER III.

SCIENTIFIC PSYCHOLOGY.

But what, then, will psychology say if we for the present remove quite into the background the inner subjective side of human nature? And yet we have had given us in this century not only a scientific, but even a mathematical psychology too, and there are a number of sensible and excellent people who quite seriously believe that Herbart with his differential equations has as thoroughly mastered the world of ideas, as Kopernikus and Kepler the world of the planets. This is indeed as thorough a delusion as phrenology, and as to psychology as a natural science, so much mischief has been worked by this pretty name, that we might easily run the risk of pouring away bath and child together. We shall, however, be able to give their full value to the beginnings of a really scientific and, in parts, even mathematical treatment of psychological questions, without abandoning the standpoint we have already taken up.

First of all, we must point out that the notion of psychology can only be a rigidly determined and completely clear one to the scholastic or the ignorant pedant. It is true that even able and sagacious men have begun their supposed scientific investigations with a section 'Of the Nature of the Soul;' but it was merely a reaction of the hollow scholastic metaphysic when they imagined that they could thus gain a firm basis for their investigations. Those cases, of course, must be excepted where the notion of the soul is only historically or critically treated.

But the man who begins with positive principles as to the soul, as, *e.g.*, of its simplicity, extensionlessness, and so on, or who feels bound to carefully hedge in the field of his inquiry into the soul before he begins to build, can hardly be expected to give us a scientific treatment of the subject. What should we say of a physicist who began by explaining the nature of Nature, and who would only consider his inquiries as likely to be of service when he had first made it quite clear what Nature is? It is still more obvious if we think of special departments. Had Gilbert not rubbed his bits of amber until he was clear as to the nature of electricity, he would probably never have taken a great step towards the knowledge of its nature. What inquirer could to-day exactly define magnetism? The idea becomes transformed in the hands of inquirers. From the power of the magnet to attract iron there comes a more general power. The earth is perceived to be a magnet. The connexion with electricity is discovered. Diamagnetism is traced through a mass of the most surprising phenomena. Where would have remained the brilliant discoveries of Oersted, Faraday, Plücker, if they had first sounded metaphysically the notion of magnetism and then proposed to begin their scientific investigations?

It is a remarkable monument of the philosophical fermentation in Germany that so subtle a thinker as Herbart, a man of admirable critical acuteness and great mathematical skill, could have come upon so adventurous an idea as that of finding by speculation the principle of the statics and mechanics of ideas. It is still more striking that so enlightened a mind, with a genuinely philosophical tendency to practical life, could lose himself in the laborious and thankless task of working out a whole system of mental statics and mechanics from his principle, without having any voucher whatever in experience for its truth. We see here how peculiar are the relations between a man's gifts and achievements. That Gall should not be

protected by his great experience, his extensive and special knowledge, from the invention of phrenology is, with his imaginative and ardently creative character, easily intelligible; but that Herbart could invent a mathematical psychology, while he was pre-eminent in the very qualities which are calculated to protect men against such courses, must always be regarded as a highly remarkable testimony to the violence of the metaphysical whirlpool, which in our country at that time mastered even him who struggled against it, and hurled him out into the intellectual comet-orbit of visionary discoveries.

Nevertheless, Herbart's powerful effort deserves a better refutation than that of mere disregard. But the previous attempts at a worthy critical disproof of mathematical psychology have the defect of losing themselves in miscellaneous discussions, and partly do not at all indicate, partly do not indicate precisely enough, the elementary logical fallacy in the deduction of the fundamental formula. We have attempted in a separate essay [40] to fill this gap in our philosophical literature, because our rejection of mathematical psychology shall not go into the world without proofs: but here the troublesome task of demonstration would disturb the connexion and confuse the clearness of our criticism, so far as it concerns Materialism. If there were a mathematical psychology, we should have to take it into account even on this ground—that it would be the surest proof for that regularity of all psychical processes which Materialism rightly maintains, and at the same time the most complete refutation of the reduction

[40] Die Grundlegung d. mathemat. Psychol., Duisb. 1865. Cornelius has attempted a refutation in the Zeits. f. ex. Phil., Bd. vii., H. 3, which, despite its dogmatic tone, seems to demand no answer. A calm comparison of the grounds and counter-grounds would be enough to show the untenableness of mathematical psychology. Wittstein has attempted a new foundation of mathematical psychology, which avoids the errors pointed out by me in Herbart's foundation, but at the same time leads also to quite other results than those of Herbart. It is, however, easy to see that if once the pretension to rigid metaphysical deduction of the principle is given up, in point of method there is as yet no occasion for propounding such a theory at all.

of all that exists to matter. We should have at the same time seriously to modify our account of the relation between brain and soul, since Herbart's mathematical psychology can hardly be separated from his metaphysic. As it is, however, there is for us no mathematical psychology, and only in its existence could we find any reason for another detailed discussion of a metaphysical basis for psychology after Kant. If later it becomes generally conceded that we can know nothing of the ultimate ground of all things; if it has been agreed to reckon the constructive instinct of speculation amongst the artistic impulses; if we become unanimous—in this point passing beyond Kant—that the instinct of unity in our reason always leads to poesy, which only indirectly advances science; then we may again bring forth Herbart's metaphysic also without danger of confusing our ideas, and a point will be discovered in it which exhibits a remarkable analogy with the metaphysical principles of the natural science of our present mathematical physicists. The really existent is, according to Herbart, a multeity of simple beings, which differ, however, very essentially from Leibniz's Monads. These produce the whole world as representation from themselves. Herbart's 'real things,' on the contrary, are in themselves quite devoid of representation; but they act upon each other and struggle to avert from themselves this action. The soul is such a simple being, a 'real' thing, which comes into conflict with other simple beings. Its acts of self-preservation are ideas. As without pressure there is no resistance, so without disturbance there would be no ideation. New is it here, at all events—and worthy of noting for future metaphysical home-use — that the essence of the activity of the soul consists in a reaction against our external influences. We are obliged to compare with this the view of recent molecular theorists that the notion of a force by no means belongs to the single atom, and exists only in the reciprocal relations of several

atoms. Herbart has, it is true, never quite seen that in consistency he must have said that all ideas lie not in the 'soul,' the simple being, but that they are reciprocal relations between the separate realities, like the physical forces between the atoms. By this consistency in his fundamental theory Herbart would have escaped innumerable contradictions which resulted from the fact that the soul had to be simple and unchangeable without any internal statics, and yet had to carry the ideas within itself. He thus maintains a sort of immortality of the soul, which is much like an everlasting death, if there are no other simple beings to be found to enter into so close an interaction with it, as the constituent parts of the body. This is to pay dearly for an empty notion!

As it is from Herbart's school that the efforts have mostly proceeded to found a scientific psychology, it is often of interest to exhibit the latent contradictions necessarily involved in the assumption of a soul absolutely simple and yet having ideas. The absolutely simple is also incapable of any internal change, because we can only conceive this in the form of a changing arrangement of parts. Therefore, too, Herbart does not say that the 'realities' act upon each other, but that they would if they did not offer resistance to this action by an act of self-preservation. As if this could possibly mean anything else than the assumption of a simple reciprocal action! Waitz in his 'Psychology' (p. 81) attributes much value to the distinction between dispositions to a state and actual states. So it goes in metaphysic. States the soul must not have —not on any account, otherwise its absolute unity would be gone! But dispositions, that is something quite different; 'efforts,' why not? The metaphysician with an enormous show of acuteness refutes all other possible views, and, when he unfolds his own opinion, he throws a logical somerset of the usual kind. Every one else sees that a disposition to a state is also a state, that self-preservation against a threatening influence is not conceivable

without an actual, however slight, influence. The metaphysician does not see this. His dialectic has carried him to the edge of the gulf; he has turned about, dragged out, flung away every notion a hundred times over, and at last it is absolutely necessary to know something. So then he shuts his eyes and boldly makes the *salto mortale* from the heights of the keenest criticism into the most vulgar confusion of word and notion! If this succeeds, he cheerfully goes on. The greater are the contradictions that are taken up into the first basis, the more freely may we draw conclusions, just as we can often deduce, as everybody knows, the most remarkable things from mathematical propositions that have the latent factor zero.

Herbart has himself said in one place that instead of a 'History of Psychology,' such as F. A. Carus has written, we need much more a criticism of psychology.[41] We are afraid that if this were to be written now, there would not remain very much of the whole supposed science.

Yet we have a scientific psychology in its first beginnings, and in fact Herbart's school forms for Germany an important link in the epoch of transition, although here science is only beginning painfully to struggle free of metaphysic. Waitz, an acute thinker, who obviously, however, in common with lecturers and assistant-professors, began to write much too early, and so as it were froze in the midst of his development, so far freed himself from Herbart that he rejected mathematical psychology and transformed the whole metaphysical basis of Herbart's psychology into what is supposed to be a hypothesis on the nature of the soul. This is, indeed, but a trifling gain. To have clear hypotheses instead of obscure and absurd dogmas would be a great step forward. But what is the good of a hypothesis on the nature of the soul, or even a hypothesis merely on the existence of a soul, so long as we still have so little accurate knowledge of the particular phenomena which are the first things to be consi-

[41] Psychol. als Wissenschaft, i. S. 44 (§ 17).

dered by any exact investigator? In the few phenomena which so far have been made accessible to more precise observation, there is not the smallest occasion to assume a soul in any very definite sense at all, and the secret reason for the assumption lies ever only in tradition, or in the mute effort of the heart to resist pernicious Materialism. This involves a double misfortune. Scientific psychology is spoiled and corrupted, while the saving and strengthening of the ideal, which is believed to be threatened by Materialism, are not secured, because it is supposed that something wonderful has been accomplished when a new glimmer of demonstration is brought for the old myth of the soul.

"But does not psychology then mean the doctrine of the soul? How, then, is a science conceivable which leaves it doubtful whether it has any object at all?" Well, here we have again a charming example of the confusion of name and thing. We have a traditional name for a considerable but by no means accurately defined group of phenomena. This name has come down from a time when the present requirements of strict science were unknown. Shall we reject the name because the object of science has been changed? That were unpractical pedantry. Calmly assume, then, a psychology without a soul! And yet the name will still be useful, so long as we have something to study that is not completely covered by any other science. It is true that its boundaries on the side of physiology are not easy to draw. But that is no harm either. If the same discoveries are made in two different ways, their value is all the greater. Yet we can only clearly understand this relation when we come to consider the question of the procedure of psychology, which will involve a criticism of the notorious notion of self-observation.[42]

Of 'observing oneself' Kant says that it is a methodical collection of the observations made upon ourselves, which

[42] Comp. Brentano, Psychol. vom empir. Standpunkte, Leipz. 1874, i. S. 13.

affords the material for a diary of the self-observer, "and easily leads to enthusiasm and hallucination." He warns us against "occupying ourselves at all with the examination, and, as it were, studied redaction of an inner history of the involuntary course of our thoughts and feelings;" and that "because it is the straight road in mental confusion from supposed higher inspirations and powers—who knows from where?—influencing us without our will to be landed in illuminatism or terrorism." "For, without perceiving it, we make supposed discoveries out of those things we have ourselves introduced into our minds, like Bourignon or Pascal, and even an otherwise admirable intellect, Albrecht Haller, who through the long-continued though often interrupted diary of his spiritual condition at last reached the point of asking a famous theologian, his former academic colleague, Dr. Less, whether in his extensive treasures of divine learning he could not find consolation for his troubled soul." And further, "that the knowledge of man through internal experience, because to a great extent he judges others also by it, is of great importance, but yet, at the same time, is perhaps of greater difficulty than the right judging of others, since the inquirer, instead of merely observing, introduces much into his self-consciousness which makes it advisable, and even necessary, to start from the phenomena observed in oneself and then only to pass on to the affirmation of certain principles concerning the nature of man, *i.e.*, to internal experience."

Kant based his own empirical psychology, therefore, not on self-observation, but essentially on the observation of others. He had, however, in his 'Critick' assigned a special department to the "internal sense," and the abuse of this arena of metaphysical caprice was the necessary result.[43] Enthusiasm and hallucination indeed were left

[43] The doctrine of the 'internal sense' has its roots in the reflexions of Aristotle (De An. iii. 2) on the perceiving of perceptions. It is developed in Galen, who distinguishes three internal senses: the *φανταστικόν*,

to the previous century, the excited natures of whose men were better fitted for them; but what fantastic caprices and unrestrained speculation could do was bravely done through the introduction of any and every invention into the supposed field of observation of the internal sense. A model in this respect has been offered to us by Fortlage, who as extraordinary professor at Jena in 1855 created two thick volumes which he called 'System of Psychology as Empirical Science from the Observation of the Internal Sense.' First he makes it clear what the inner sense is, and attributing to it a series of functions which

διανοητικόν, and μνημονευτικόν. Their business is to apprehend the material delivered by the external senses and to know it consciously (answering to the 'sensus communis' of the Scholastics, the φανταστικόν of Galen), by combination and separation to gain other knowledge from it (cogitatio = διανοητικόν), and to preserve this knowledge and to restore it again to consciousness by recollection (memoria). To these three internal senses special brain-organs were assigned in the front, middle, and back of the head. Above them stood the reason, as essentially of a different nature. This doctrine held sway (comp. *e.g.* in Melanchthon's Psychology the chap. *De Sensibus Interioribus*), until Descartes, who left the Galenic basis and made a very different distinction, which was later frequently confused with the traditions of an external and an internal sense. According to Descartes, the senses deliver only purely corporeal copies of things in the brain, which are perceived by the soul. This incredibly naïve anthropomorphism, which simply puts a man into a man, is connected with just as naïve an abstraction—that the corporeal pictures of things in the brain are extended; but their perception by the soul is an act of 'thought' (cogitare) in the wider sense, *i.e.*, an extensionless act of an extensionless being. Thus the object of ideation, which it is, properly speaking, that occupies our consciousness, is arbitrarily and irrationally sundered from the act of ideation. But in this way the absolutely non-sensuous and non-spatial thinking which runs through all modern philosophy (the sharpest opposition to this phantom is found in Berkeley) is first made possible, and 'ideas' of the soul are spoken of quite unconcernedly, as though in them the content—and this the only essential thing—was also thought; but as soon as it is a question of maintaining the non-spatiality of the soul, the idea is again conceived as a mere act of ideation, *i.e.*, as something that when separated from the object of the idea is a pure nonentity. Leibniz then gave us the distinction of sensible 'perception' (in Descartes 'perceptio' is the perception of the soul) from 'apperception,' which is the conscious apprehension of the object by the soul; again a distinction which became fused traditionally with the 'internal' and 'external' sense, although Leibniz does not at all concern himself here with the doctrine of the internal sense. But in Wolff, Bilfinger, and others of his chief followers, this doctrine is nowhere expressly treated. Wolff, however, speaks in the 'Rational Psychology'

are usually assigned to external sense, then he marks off his field of observation and begins to observe. It would be quite useless to offer a prize to any one who should hunt out a single real observation in the two thick volumes. The whole book deals in general propositions, with a terminology of his own invention, without a single definite phenomenon being described of which Fortlage could tell us when and where he observed it, or how we must proceed in order to observe it too. We are very prettily told how, *e.g.*, in considering a leaf, as soon as we are struck by its form, this form becomes the focus of attention, "of which the necessary consequence is that the scale of forms fusing with the form of the leaf on the law of similarity becomes clear to consciousness."

of an internal and external 'acumen' of sense (§ 269), meaning by this the sharpening of the faculty of sensible perception by an internal or external cause; accordingly a distinction again of quite another kind. Tetens, Phil. Vers. über d. menschl. Natur, 1777, i. S. 45, complains that Wolff does not employ the notion of the internal sense. He himself calls, closely approximating to Locke's 'reflexion' in opposition to sensation, "ideas of the internal sense" those "which we have of ourselves, of our internal changes, of our activities and faculties."

Kant appears to have adopted the 'internal sense' on the same ground on which he allowed to the notions of the traditional psychology and logic so extensive and, in fact, so fatal an influence on his system; namely, that he believed that he had in the old, and in a certain sense verified network of notions, a guarantee for the completeness of the phenomena with which he had to deal. That everywhere not the traditional theory, but the traditional classification was the main point with him, appears in the freedom, partly also in the caution, of his definitions, which everywhere connect themselves as little as possible with traditional notions, and aim only at an accurate, and never unnecessarily prejudging, delimitation of the matter.

According to Cohen, Kant's Th. d. Erfahr., S. 146 ff., Kant adopts the external sense in order to refute "material idealism" in the very sphere in which it sought its main support, and to deprive the dogma of the soul-substance of its most essential basis. Kant therefore teaches expressly that either no internal sense at all must be assumed, or the subject, which is its object, must, like the objects of the external sense, be *phenomenon*. How far Kant in this (on Cohen's view) was already on the way to a perfectly sound psychology, which transformed the 'faculties' into *processes*, we leave here undetermined. At all events, the immediate effect of the assumption of an 'internal sense' was unfavourable and misleading. Here, too, we must point out that the transcendental deduction of Time which is connected with the doctrine of the 'internal sense' is far from having the same evidence as that of Space, but on the contrary is exposed to the most serious doubts.

We are told that the leaf now "in the space of imagination disappears in the scale of forms," but when, how, or where this has ever occurred, and upon what experience this 'empirical' piece of knowledge is based, remains just as obscure as the mode and manner in which the observer applies the 'inner sense,' and the proofs that he makes use of such a sense, and does not, it may be, crystallize his own crude guesses and inventions at haphazard into a system.

In our opinion it is quite impossible to draw a fixed line between internal and external observation. When the astronomer looks at a star, this is called external observation; but so soon as he recognises at the first glance that it is Mars, he must, according to Fortlage, have used at the same time the internal sense; for the eye sees only a light point; the astronomer sees at once and without reflexion Mars, because he knows him. Has he now used on this account a different mental organ than the man who only sees the star, or the child who only sees the light point, and knows nothing yet even of stars? Fortlage says, "He who by the study of music and listening to the best compositions qualifies himself for a heightened musical appreciation, arms the external by the internal sense, and when afterwards in a piece of music he immediately distinguishes in feeling between faults and beauties, character and superficiality, direct movement from counter-movement, sharp from flat, the distinguishing faculty here is no less one brought about and contributed by the internal sense, than in the case of a foreign tongue, which we only understand when we have learnt it." On our view there lies an extremely interesting problem of the psychology and physiology of the future in inquiring how it is that the painfully acquired connexion between sensations of sound and other brain activities seems later to express its effect quite immediately. So long as we know no method of approaching this problem by following up our own sensations or by

some other means, we do well meantime to believe that in all probability in both cases we hear with our ears.

How are we to deal with the cases where the immediate sight of every healthy eye, without any special training, at once effects an elimination, a completing or varying of the mechanically produced picture? Do we see stereoscopically with the internal sense or with the external? Do we fill up those places in the field of vision which coincide with the place of entry of the optic nerve by the internal sense? Do we hear a chord as such with the external sense? But we may go farther and ask, Is it external observation when we touch the nerve terminations in the skin with the point of a pair of compasses, and these are now felt as one point, now as two? Is it self-observation when we turn our attention to an aching corn? When we send a galvanic current through the head and perceive subjective colours or sounds, in which province does this fall. With 'within' and 'without' we can do nothing at all; for I can have no ideas at all outside myself, even if the theory is correct on which I project outwards the objects I perceive. Seeing and thinking are equally internal and equally external. If I wish to think my thoughts again, I call forth those sensations in the vocal organs which we regarded above as the body of thought, as it were. I feel them as externally as any other sensation; and as to the mind, content, meaning of this complex of the subtlest sensations, it is no otherwise than with the æsthetic value of a drawing. It is not to be separated from the lines of the drawing, although it is something different. A similar antithesis between form and matter of sensation reappears, however, constantly in innumerable degrees, without my ever being able to say of a particular class of sensations that here the internal begins and the external ends.

How unconcernedly Fortlage lays down that the field of physiology is man, so far as he is perceived with the external sense, but that of psychology man so far as he

is perceived with the internal sense! Most people would call it psychology if we observed the first words of a child in order to draw conclusions as to the development of the mind; physiology, on the other hand, if we prick new-born children with a needle, or tickle them in order to watch the reflex movements in their transition to volition. And yet for both sets of observations we use our ordinary senses, and on Fortlage's principle the internal sense as well, because in both cases what we see and hear requires first to be interpreted. Altogether it is not hard to see that the nature of any and every observation is the same, and that the difference chiefly depends merely on whether an observation is such that it may be also made by others at the same time or later, or whether it evades any such control and confirmation? External observation would never have led to a sure empirical, or even an exact science, unless every observation had been capable of being tested. The elimination of the influences of preconceived views and tendencies is the most important element of exact method, and this element becomes inapplicable just in those observations which are directed towards our own thoughts, feelings, and impulses; even though it be that we have fixed our own thoughts quite impartially by writing or other means, and then examine the sequence of ideas as though they were those of a stranger. Truth to say, however, this kind of self-observation, just because of its comparative trustworthiness, is very little liked, and the boasted system of self-observation seems to be so much liked precisely because of its defects. For even though, as Kant feared, enthusiasm and hallucination are not in its train, yet it will always continue a means of lending to the most fanciful imaginations of metaphysic the appearance of empirical deduction.[44]

[44] It may here be cheerfully conceded that quite recently the observation of phenomena described as 'internal' has made great advances, and that some useful work has been done in this department, not only by

It is with full right, therefore, that modern psychologists have applied to psychology the usual strictly methodical mode of observation, which has done such excellent service in the natural sciences. In this respect Lotze has done admirable service by his 'Medicinische Psychologie,' 1852, though he was not restrained by the title of his book from prefixing to his empirical and critical inquiries a hundred and seventy pages of metaphysic, to which it is owing that medical men have not benefited by the book as they might otherwise have done. Later, the younger Fichte presented himself to physicists and medical men

physiologists, but also by men who are endeavouring to restore an empirical psychology; thus, *e.g.*, by Stumpf in his delicately conducted inquiry into the representation of surface by the sense of sight (Ueber d. psych. Ursp. d. Raumvorst., Leipz. 1873, Kap. i. Much less successful are the inquiries in the second chap. on the 'Representation of Depth'). It is, however, easy to see that the procedure here is absolutely the same as in external observation, and that this kind of 'self-observation,' if we will use the phrase, extends exactly as far as imagination, whose functions are so closely related to those of external perception. Brentano, Psych. v. empir. Standp., i., Leipz. 1874, entirely agrees with our criticism of 'self-observation' in Fortlage's fashion; he maintains, however (S. 41), that I have been led by the confusion in this department to unjustly deny internal 'perception,' *i.e.*, then the 'internal sense' (comp. the previous note). We can never direct our attention immediately to the psychical facts, and, therefore, cannot 'observe' them either, but we may very well 'perceive' them, and this perception may then by the aid of the memory be subjected to a more careful investigation. The objects of 'internal perception' in opposition to external are, according to Brentano, the 'psychical phenomena,' and they are to be distinguished from the physical phenomena by the criterion of "intentional inexistence," *i.e.*, of the reference to something as object (S. 127). Accordingly Brentano reckons among physical phenomena not merely the phenomena which the senses give us, but also the pictures of imagination; psychical, on the other hand, is the idea as act of ideation (S. 103 f.). He thus, indeed, gains, like Descartes (comp. the previous note), a sure distinction between the physical and the psychical, but with the danger of making a mere illusion the foundation of his whole system. The impossibility of separating the act of ideation from its content we have shown in the previous note. But how is it with the emotions? Anger, *e.g.*, is, according to Brentano, a psychical phenomenon, because it refers to an object. But what can we perceive in anger and observe with the aid of memory? Nothing but mere sensuous symptoms, in which again the perception everywhere stands in entire analogy with ordinary external perception. The mental element in anger lies in the mode and manner, in the measure, connexion, and order of these symptoms, not in a separable process, which might be specially perceived.

in his 'Anthropologie' (1856), as it were as a sort of philosophical family doctor and spiritual adviser. Although his book, through its logical weaknesses and pretentious repetition of obsolete errors, has only injured the reputation of philosophy amongst men of science, yet in other circles it has greatly contributed to bring the close connexion of psychology and physiology home to the general consciousness. Nay, in those days happened the miracle that the Epigoni of the Hegelian philosophy partly turned towards a sober, almost scientific, treatment of psychology. George wrote a good little book on the Five Senses; Schaller found himself driven by his struggle against Materialism into a thorough consideration of the physiological element. Later, each of these men published a psychology; and in both of these works the character of the epoch is unmistakable. It deserves all praise that they are fully conscious that in essentials they still stand upon the ground of speculation, although they do so no more than do also the founders of the supposed scientific psychology. We must, on the other hand, always combat pretensions which seem to assume that speculative knowledge is higher and more credible than empirical knowledge, to which it is related simply as a higher to a lower stage. May our readers not take offence at this. It belongs to the central truths of a new epoch of humanity now dawning—not that, with Comte, we should abolish speculation, but certainly that we should once for all assign it its place, that we should know what it can do for knowledge and what not.

Schaller thus expresses himself as to the relation. "Natural science may boast itself as exact knowledge, if it contents itself with discovering the laws of phenomena by observing them and with formulating the quantitative relations which are directly contained in these ascertained laws. Of course every one is at liberty to content himself with this exact knowledge; but then he necessarily resigns also any answering of all the questions with which philo-

sophy has concerned itself from the beginning.[45] Well, then, how variously philosophy has answered the questions with which it has concerned itself is familiar enough. The agreement, however, which prevails, on the other hand, in the natural sciences, proceeds not from those sciences confining themselves to a field where everything is obvious, but from their applying a method whose doctrines, as ingeniously elaborated as they are true to Nature, have only been revealed to mankind after long efforts, and the limits of whose applicability we do not know. The core of all the numerous cautionary measures of this method lies, however, just in the neutralising of the influence of the observer's subjectivity. But it is precisely the subjective nature of the individual man to which speculation owes each of its particular forms. Here, too, we must assume that in the similar organisation of all men, and in the common development of humanity, lies an objective basis for the individual phenomena, much as in architecture or in music similar principles appear amongst different and separated peoples. Whoever now is content under the sway of this mysterious constructive impulse of humanity to build up a temple of notions which is not indeed in serious conflict with the present state of the positive sciences, but is overthrown by every methodically-gained advance, or is razed to the ground and rebuilt in another style by every later builder, may indeed pride himself on a graceful and in itself perfect work of art, but at the same time he also necessarily resigns the hope of advancing by a single step true and permanent knowledge in any department whatsoever. What now each one will choose must remain with himself. As a rule, that will seem to each most desirable which he himself is doing.

To what extent now scientific method can be applied to psychology must be shown by the result. We will premise that it is not merely the borderlands of nervous

[45] Schaller, Psychologie, Weimar, 1860, S. 17.

physiology which admit an exact treatment. However undefined we may leave the boundaries of psychology, at all events we must for the present include in it not only the facts of sentient life, but also the investigation of human action and speech, and generally of all manifestations of life, so far as an inference is possible from them to the nature and character of man. The clearest proof for this is the existence of an Animal Psychology, the materials of which can hardly be very well collected by means of the 'internal sense.' Here, where external observation shows us primarily only movements, gestures, and actions, the interpretation of which is liable to error, we may nevertheless carry out a comparatively very exact procedure, since we can easily subject the animal to experiments and put it into positions which admit of the most accurate observation of each fresh emotion and the repetition or suspension as we will of each stimulus to a psychical activity. Thus is secured that fundamental condition of all exactness; not indeed that error is absolutely avoided, but certainly that it can be rendered harmless by method. An exactly described procedure with an exactly described animal can always be repeated, by which means our interpretation, if it is due to variable bye-conditions, is at once corrected, and at all events thoroughly cleared from the influence of personal preconceptions, which have so great a share in so-called self-observation. If now we have as yet no system of animal psychology, yet we have the beginnings of observations which in accuracy and fruitfulness lead us far beyond the standpoint of Reimarus and Scheitlin. The constant increase in the number of zoological gardens promotes these studies, and however much the free life of the animals in field and forest may differ from their condition in captivity, yet an exact observation based upon this latter condition is not less valuable for the purpose of establishing general propositions. For the problems of Materialism or Idealism the most interesting matter will

perhaps be found later, where it has as yet been sought least—in the observation of the lower animals in regard to their sense-perceptions. Indeed, Moleschott has already pointed out that a vorticella with an eye possessing only a cornea must receive different pictures of objects from the spider, which possesses also lenses and corpora vitrea. Much as we missed in our criticism of this passage * a clear conception of the relation of object and subject, yet this observation is certainly important; indeed, it is not improbable that here in a very much wider sense the most remarkable things will be revealed, when exact observations are completed of the sentient activities of creatures organised so differently from ourselves. The effect of the different vibrations which are revealed to us by physics must here be examined quite independently of the question whether they cause particular sense-perceptions in *our* organs or not. If, for example, there should be creatures which smell or taste the light (*i.e.*, perceive it by organs similar to our organs of smell or taste), or which receive visual images through a source of warmth which is dark to us, then the doctrine of the shaping of the sensible world by the subject would receive a new support. On the other hand, should it be shown that through all the manifold forms of the animal world there are probably no sensations essentially different from ours, this would for the present be in favour of Materialism.[46]

* Comp. supra, vol. ii. p. 277.

[46] In this branch, too, since the appearance of our first edition, some very promising beginnings of an insight have been gained. On the one side we have Bert's experiment on the sensations of light in water-fleas, which seems to prove that in these creatures precisely the same rays excite the sensation of light as in man (communicated to the French Acad. 2 Aug. 1869); on the other side the researches of Eimer and Schöbl (Arch. f. mikrosk. Anat. vii. Hft. 3, cit. Naturf. iv. No. 26) on the organs of touch in the snout of the mole and the inner ear of the mouse, where there is such an unusual abundance of apparatus of touch, that we must suppose the kind of sensation as well as the performances of what we call the sensation of touch to be specifically different. Exact experiments are still lacking, as, on the other hand, we still need the physiological and anatomical explanation for the results long known to us of the "bat-sense" (according to Spallanzani's

An important contribution to the foundations of a future psychology lies also beyond doubt in the only very recently systematically instituted experiments on new-born infants. If we wish to understand the mechanism of psychical processes, we must above all seek to observe the first and simplest elements of this mechanism. It is astonishing with what phlegm our good philosophers can conduct an argument on the origin of consciousness, without ever feeling it necessary to go into the nursery and see exactly what takes place there in connexion with this problem. But so long as words patiently allow themselves to be marshalled into a system, and students patiently write down this system, publishers patiently print it, and the public regard the contents of these books as very important, the philosopher does not so easily find any occasion for farther steps. Then at length comes the physiologist,[47] gives new-born infants sugar or quinine to taste, holds a light near them, or makes a noise in their ears, and most accurately describes what movements, muscular contortions, and so on, he has observed. He combines the observations which he has made on prematurely born or mature infants, notes carefully the differences, and compares the results of anatomy and pathology. Finally, he seeks so to arrange his observations as to ascend from simple reflex movements to the sure signs of consciousness, and, in fine, knows a great many things which are quite strange to the philosopher in his solitary study, and yet which are often quite indispensable for the decision of important questions. Even though nothing more resulted from these empirical inquiries than the fact that from pure reflex movement to conscious

experiments). So, too, the hairs moved by the vibrations of sound on the fur body-surface of the crabs (Hensen, St. über d. Gehörorgan d. Decapoden, Leipz. 1863, cit. in Helmholtz, Lehre v. d. Tonempfind., S. 234 f.), as well as the nerve-hairs on the skin of young fishes and naked amphibia (according to F. H. Schulze in Müller's Archiv, 1861, p. 759), must probably produce sensations of quite another quality than ours. Cp. Wundt, Physiol. Psych., S. 342.

[47] Comp. Kussmaul, Unters. über d. Seelenleben d. neugebornen Menschen, Leipz. 1859.

purposeful activity there is the most imperceptible transition, and that the beginnings of the latter reach back into prenatal life, even that, in the light of real science, would be much more than can be learnt from whole volumes of speculative 'Inquiries.'

Another object of recent efforts which bears upon this question is Ethnopsychology (Völkerpsychologie), which, however, has not as yet attained a sufficiently definite form and method to require a discussion, especially as the problems of Materialism are less closely connected with this department. It is, however, noteworthy that linguistics, which is justly regarded as one of the most essential sources of ethnopsychology, has greatly contributed to bring speech into the domain of scientific treatment, and thus to fill up at a new and important point the earlier gulf between the sciences of mind and nature. In this respect, too, is the first half of our century epoch-making. Wilhelm v. Humboldt's famous work on the Kawi Language and Bopp's Sanskrit Grammar and Comparative Grammar appeared in the otherwise so fertile period from 1820 to 1835. After this, linguistic inquiry made wonderful progress in every direction, and Steinthal especially laboured in a long series of important treatises to exhibit clearly the psychological essence of speech, and to do something to prevent the continual confusion of logical thinking with that formation of concepts which goes on hand in hand with speech.

Strikingly unfruitful for psychological problems were for a long time the travels of men of science, and the comparison of their results in anthropological and ethnographical respects. We need only take in hand Prichard's once so famous work on the Natural History of Man to be convinced what a mass of misunderstandings proceeded from the religious prejudices of the reporters, from their pride of race, and from their incapacity to throw themselves into the modes of thought of lower grades of civilisation. Quite recently things have improved. In particu-

lar, Bastian's narratives of travel are rich in psychological traits, and his comprehensive works[48] betray a predominant interest for comparative psychology, even though the guiding-points of view oft get lost amid the accumulated material. In Waitz's 'Anthropologie der Naturvölker' we may follow the progress of intelligence from page to page; but the last volume of Waitz's work, written by Gerland, is excellent in this respect. If we now add Lubbock's luminous comparison of the results of palæontology with the condition of modern savages, as well as Tylor's 'Primitive Culture' and 'Early History of Mankind,' we have already such a wealth of facts and combinations that a systematic 'Ethnopsychology,' or a 'pragmatic anthropology' on an entirely new basis, can no longer appear impossible. If we ask, however, for the results which are already most evident, it cannot be denied that in all recent and better observations man, taken in all his various states of civilisation, appears as a natural being, whose whole activity is determined by his organisation. Where earlier, upon a superficial view, we saw only 'savages' or harmless children of nature, we now find the evidences of a history, of an old refined civilisation, and often even the clear traces of decline and retrogression. We see how society, even in people who in other respects are still at a standpoint of childish immaturity, everywhere brings with it quite early peculiar and often bizarre arrangements, which, despite the utmost variety, may yet be developed from some few constantly recurring psychological principles. Despotism, nobility, caste,

[48] Der Mensch in d. Geschichte, Leipz. 1830, 3 Bde.; Beitr. z. vergl. Psychol., Berl. 1868; Ethnol. Forschungen, Jena, 1871. Principally in his work 'Das Beständige in d. Menschenrassen,' Berl. 1868, Bastian has indulged in a coarse and exaggerated opposition against Darwinism, which, however, does not affect the value of his leading idea: that the similarities in the mental condition of peoples, and especially in their mythological traditions, are to be explained, not so much by their descent from a common primitive stock, as by the same psychological disposition, which must necessarily lead to the same or similar creations of superstition and story.

superstitions, priestcraft, and fettering ceremonies shoot forth everywhere quite early from the common root of human nature, and in the principles of these widely spread deformities there is often seen the most striking analogy between races which have hardly clothes and huts, and others which possess palaces, proudly built cities, and an abundance of implements and objects of luxury. The state of nature, whose loss was deplored by Rousseau and Schiller, is nowhere visible; rather everything is nature, but a nature as little correspondent to our ideals as the ape-like figure of our hypothetic ancestors to the ideals of Pheidias or Raphael. It seems as though man, while he leaves behind him the limits of brutishness, and as an individual is developed and ennobled by society, in forming a comprehensive ethnopsychology must once more pass through all the perversity and hideousness of apishness, until at length the germs of nobler qualities that lie deep but surely within him—but we have not yet got so far! Even Hellenic civilisation rested upon the rotten basis of slavery, and the noble humanity of the eighteenth century was only the possession of narrowly limited circles, who carefully held themselves aloof from the masses.

Darwin also has contributed magnificent material for the psychological understanding of the human species, and struck out new paths in which plentiful matter may be gained for whole departments of psychology. Here belongs, in particular, his essay on the 'Expression of the Emotions,' often disparaged because of its hardness and one-sidedness. Descartes in his much too little regarded treatise on the emotions had already entered on the way of defining and explaining them by their corporeal symptoms, although on his theory the emotion, as such, can only come about when the soul 'thinks' what it perceives in the brain as a corporeal phenomenon. In more recent times, Domrich in particular has the merit of treating thoroughly the corporeal phenomena by which psychical conditions are accompanied, but his work has been little

used by the psychologists.[49] It would necessarily be otherwise, if it were but generally seen in how high a degree the consciousness of our own emotions is only determined and brought about by the sensation of their corporeal reactions. Yet it is, in fact, with them just as it is with the consciousness of our bodily movements; an immediate knowledge of the impulse set up is indeed present, but we only attain to perfect clearness as to the phenomenon through the backward rush of the sensations, which are occasioned by the movement.

But the corporeal symptom attains a quite special importance for the psychical process in the movements of utterance. We need only observe how language in the primary meaning of the expressions for the emotions always keeps to the corporeal symptom, and especially often to the movements of utterance, and we soon see how man has been guided by these symptoms, and how only through them all internal phenomena have received their character and demarcation from other related phenomena. And therefore we can never hope to attain any serious results in the theory of the emotions without the most serious study of their symptoms.

Here again then, we come upon a method in psychology which might be called Materialistic, were it not that this expression includes also a reference to the basis of the whole theory of things, which is here not at all in place. We do better, therefore, to speak of a 'somatic method,' which commends itself as the only one that in most branches of psychology promises success. This method requires that in psychological inquiry we should as far as possible keep to the corporeal processes, which are indissolubly and by law connected with the psychical phenomena. In applying it, however, we are by no means obliged to regard the corporeal processes as the ultimate basis of the psychical element, or even as the only really

[49] Die psychische Zustände; ihre organische Vermittelung u. ihre Wirkung in Erzeugung körperlichen Krankheiten, Jena, 1849.

existent, as Materialism does. Just as little, of course, must we allow ourselves to be misled, because of the few departments which are as yet inaccessible to the somatic method, into assuming here psychical events without a physiological basis. We may, that is to say, in the case of the theory of the succession of ideas, *i.e.*, of the influence of already present ideas, or of those newly coming into consciousness, upon the succeeding ones, not only work out the doctrine theoretically, but even support it to a much greater extent than has yet been done upon experiment and observation, without troubling ourselves farther as to its physiological basis. Thus, *e.g.*, the artifice of the teachers of memory, to retain any given succession of words by inserting in thought certain connecting words, may quite well be treated as a valuable psychological experiment, the validity of which, like that of every good experiment, is quite independent of our explanation of it.[50] We may empirically establish a complete theory of mistakes in writing, or, as Drobisch has done, reduce the tendency of a poet to lighter or heavier forms of verse into definite numerical terms,[51] without any regard at all to the brain and nerves. Here it might occur to a critic to maintain either that the independence of the facts from the physiological element must be recogised here, or the procedure is not strictly scientific, because it does not go

[50] In my lectures on psychology I have always introduced some experiments of this kind, and have thus convinced myself more and more of their soundness and convincingness, as well as of their didactic value.

[51] Comp. the dissertations in the Berichte d. Königl. Sächs. Ges. d. Wissensch., Phil.-hist. Classe, 1866, 26 Mai, S. 75; 1871, 1 Jul., S. 1. Drobisch in these pioneering inquiries has not merely given a brilliant example of the application of numerical methods to philology, but also supplied the psychologically important proof that in language and poetry there appear regularities of whose production individual authors have no consciousness. What appears subjectively as tact, feeling, taste, is seen objectively as a creative impulse following definite laws. Thus there falls, *inter alia*, an entirely new light upon the numerous metrical 'leges' which have been discovered in the Latin poets since Ritschl's researches on Plautus. Much that, though with some astonishment, has been regarded as conscious rule, now reveals itself as the effect of an unconsciously operating natural law.

back to the presupposed basis of the phenomena. But the alternative is false, because empirically ascertained facts, and even 'empirical laws,' have their own rights, quite independently of their resolution into the bases of phenomena. Otherwise we might with equal justice declare the whole physiology of nerves inadequate, because it has not yet been resolved into the mechanics of atoms, which yet in the last result must underlie every explanation of natural phenomena.

In England, psychology in the time of Dugald Stewart and Thomas Brown was in a fair way to become an empirical science of the succession of ideas (Association-psychology), and in particular the latter follows the principle of association cleverly and keenly through the most various spheres of psychical activity. Since then, psychology has remained a favourite study of the English, and it cannot be denied that the study of their works affords to the statesman, the artist, the teacher, the physician, a much richer abundance of contributions to the knowledge of man, than can our German psychological literature. This psychology is proportionally weaker in the critical sureness of principles and in strict scientific form. In this respect no essential progress has been made since Brown and Stewart. What distinguishes the later works of Spencer, and especially of Bain,[52] is a careful consideration of recent anatomy and physiology, and an energetic attempt to harmonise the association-psychology with our knowledge of the nervous system and its functions. However sound the tendency of these efforts, they are not carried out without venturesome hypotheses and far-reaching structures of theory, which still lack a firm experimental foundation. We have remarked above that with regard to the functions of the brain it may not indeed be the business of exact research, but may very well be that of a preliminary explanation, to

[52] Comp. Herbert Spencer, Principles of Psychology, 2d ed., Lond. 1870–72. Alexander Bain, The Senses and the Intellect, 2d ed., Lond. 1864; The Emotions and the Will, 2d ed., Lond. 1865; Mind and Body: the Theories of their Relation, Lond. 1874.

show for once in an elaborate hypothesis how things *might* be connected together: this want is more than amply satisfied by Spencer and Bain, and their works, therefore, constitute in this respect, too, a welcome complement to German literature, however the rigid but somewhat sterile German criticism may batter at the foundations of their theoretical constructions. The distinction between the English and the German procedure in psychology may, in fact, be reduced to this: that the German scholars apply all their powers of mind to attain sure and correct principles, while the Englishmen are chiefly concerned to make out of their principles whatever can be made. This is as true for the association-psychology as such, as for its physiological foundation. Instead of improving the theory of association in its extremely defective foundations and more rigidly defining the method of inquiry, the recent writers give us only broad developments and analyses, while the foundations remain just as they were with their predecessors. A part of this foundation has been recently attacked in Germany from several sides, and particularly the deduction of ideas of space from the principle of association which prevails in England, has been submitted to an entirely just criticism.[53] This criticism, however, hits a point which is indeed of the utmost importance for the theory of knowledge, but for the special foundation of empirical psychology is of subordinate importance. We might drop this explanation of the ideas of space, and the association-psychology would still continue essentially uninjured. Yet there is another point which not only decides the fate of this science, but also proves of the highest importance for the fundamental problems of the relation of body and soul. This is the question whether for the succession of ideas at all there is a thoroughgoing and immanent causality, or not.

[53] Dr. Johnson, D. Ableit d. Raumvorst. bei d. englisch. Psychologen d. Gegenwart, in D. Phil. Monatsh., 1 Jan. 1873, S. 43 ff. Dr. Carl Stumpf, Ueber. d. psych. Ursp. d. Raumvorst., Leipz. 1873.

The sense of the pregnant question is easy to understand, if we only look back to Leibniz or Descartes. By an immanent causality we mean one which requires no extraneous connecting link. The ideational condition of a given moment must be explained purely from earlier ideational conditions. In Descartes as well as in Leibniz the ideational content of the soul forms a world complete in itself, separated from the corporeal world. Even those ideas which correspond to a new sensible impression, the mind must develop out of itself. But on what *law* the states of the soul change remains obscure. Descartes as well as Leibniz favour strict mechanism in the corporeal world. This is not applicable to the world of ideas, because here nothing can be weighed and measured; but of what kind now is the bond of causality that here connects the changing states? Descartes has no answer whatever to this question; Leibniz a very ingenious, but still inadequate one. He removes the causality of ideation into the relation of the monad to the universe, into the pre-established harmony. Although, therefore, the monad has "no windows," yet what happens in it is not ruled by an immanent principle, but by its relation to the universe, which is only accessible to speculation, not to observation. In this way any empirical psychology is made impossible, and there can at bottom be no question of laws of association or of any other thoroughgoing laws.

The association-psychology makes, therefore, also, in its exertions to establish a succession of ideas in accordance with law, altogether an exception. The sense-perceptions, in the widest sense of the notion, come from without inwards, without the question being asked how this is possible. They are from the standpoint of the soul as it were creations out of nothing, continually appearing new factors, which very seriously modify the collective condition of the world of ideas, yet which from the moment of their entrance subject themselves to the laws of association. The difficulty involved in this hypothesis

was in England easily masked by the traditional Materialism from Hartley and Priestley onwards. Their successors, who declined its consequences, at the same time retained the convenience of its mode of explanation, and did not remember that a new standpoint brings also new problems with it.

Stuart Mill has in his 'Logic'* treated at length the question here raised. He opposes Comte, who decides very positively that in states of mind there are no immanent mental laws, but that they are entirely produced by states of body. Of these there are laws; where there appears a uniformity of succession in the former, it is a merely derivative and not original uniformity, and is, therefore, not the subject of any possible science. In a word, psychology is only conceivable as a branch of physiology.

Against this strictly Materialistic view Mill endeavours to assert the rights of psychology. By giving up at once the whole department of sensible perceptions, he thinks that he can save the autonomy of the science of thought and the emotions. The sense-perceptions he gives up to physiology. Of the remaining psychical phenomena, physiology can as yet explain to us little or nothing; the association-psychology, on the other hand, enables us by means of methodical empiricism to discover a series of laws. Let us keep, then, to these, and leave the question open whether the phenomena of the succession of ideas may perhaps some day be explained as mere products of cerebral activity! Thus the metaphysical question is postponed, and at least a provisional right assured to the association-psychology. The question, however, which goes deeper and demands a critical inquiry, remains unhandled, whether we do not on a closer inspection discover in the association-psychology itself indications that its supposed laws have no absolute validity, because they represent but parts of the consequences of deeper lying physiological laws.

Herbert Spencer favours—thus approaching our own

* Bk. vi. c. 4.

standpoint—a Materialism of the phenomenon, whose relative justification in natural science finds its limitations in the idea of an unknowable absolute. He might, therefore, have quietly adopted Comte's standpoint for the sphere of the knowable; at the same time he maintains that psychology is a totally unique science, independent of all other sciences whatever.[54] He is led to this assertion by the fact that the psychical alone is immediately given to us, while the physical is only presupposed, and may, therefore, in a certain sense be resolved into the psychical. In fact, our ideas of matter and its motions are also only one kind of ideas. But colour and sound, as they are immediately presented to our mind, are, like our emotions, given earlier than the theory of their origin from vibrations and cerebral processes. Accordingly, so much is true that the sphere of psychical phenomena possesses that independence, which Spencer attributes to psychology. But the question is just this, whether the sphere of psychical phenomena may be brought into a causal connexion without reference to the theories of the physical sciences.

Alexander Bain favours a "guarded or qualified Materialism" which preserves the contrast between mind and matter. With him, as with Spencer, the body is the same thing, objectively considered, which subjectively in the immediate consciousness of the individual is soul. But by this idea, which may be traced back to Spinoza, and which Kant also allowed to be a valid hypothesis, Bain is misled into assuming a complete parallelism between mental activity and nervous activity. On his view, every nerve stimulus has a "sensational equivalent."[55] If this were so, then the causal chain on the psychical side must be just as complete as on the physical; but

[54] Princ. of Psych., 2d ed., i. p. 140.

[55] Mind and Body, p. 39: "There is a definite change of feeling, a uniform accession of pleasure or of pain, corresponding to an elevation of temperature of 10°, 20°, or 30°. So for each set of circumstances there is a sensational equivalent of alcohol, of odours, of music, of spectacle."

the facts are otherwise. Even the law of Relativity recognised by Bain, according to which we attain a conscious sensation, not so much through the absolute strength of the stimulus, as rather through the fact of a *change* of the state of stimulation,[56] is inconsistent with the sensational equivalent; for it is clear enough that one and the same nervous stimulus may now set up a very lively sensation, and another time none at all. But if by 'sensational equivalent' is meant something that belongs indeed to the inner subjective side of the phenomenon, but at the same time is not sensation properly speaking, we come to the unconscious ideas, of which we shall presently have to speak farther.

But even the strict validity of the law of association must here appear very doubtful. Spencer, indeed, to be quite safe, uses the magic formula, 'all other things equal.' Of course, if all other circumstances are absolutely the same, it seems almost axiomatic that then, *e.g.*, the livelier impression sticks more firmly in the memory; but in this way the force of the principle is reduced almost to nothing. If we say that under like circumstances a faster ship must sooner reach its goal, or a fiercer fire give more heat, we mean by this that the speed of the ship, the heat of the fire, under all circumstances exercise their constant effect, but that it depends upon other circumstances whether a certain external effect, as the attainment of a goal, the warming of a room, is brought about or not. We thus express a principle of great generality and far-reaching import. In the psychological case, however, things are quite different. It is, *e.g.*, not at all improbable that the capacity of recollection is partly conditioned by the absolute strength of the nervous process, or by the lasting organic change which is connected with it, while, on the contrary, the liveliness of the corresponding idea is dependent only on the relative strength of the excitement. So we often have, *e.g.*, in dreams ideas

[56] Ibid., p. 44 ff.

of the most astonishing vividness and clearness, which we can only recall with difficulty and by no means with the original vividness. But there are in a dreaming state only very weak nervous currents, which are the bearers of our ideas. If now we take the condition "all other things being equal" literally, *i.e.*, if we only compare dream-idea with dream-idea, and in general only certain special states of stimulation, the doctrine of the association-psychology may be correct, but it is then obviously of very limited import. In the case of the physical examples just mentioned, the result, the attainment of a goal, the warming of a room, is only a means to make quite clear the constant import of the speed and the warmth. But just this constant validity of the one factor falls away in the psychological example. The greater liveliness of the idea does not supply in all circumstances a like contribution to the end to be gained, but this contribution may in one case be very great, in another absolutely nil. We may, *e.g.*, have had in a dream extremely vivid ideas, which all the same we cannot under any circumstances remember; unless, indeed, we could restore the same dreaming state.

An instance may make this still clearer. Value in political economy undoubtedly arises from a series of physical conditions, amongst which labour plays a prominent part. At the same time, value is not proportional to labour. Other circumstances, as in particular demand, not merely come in from without to determine the result, as, *e.g.*, wind and weather contribute to the swiftness of a ship, but they are necessary in order that there may be value at all. Just so is the collective state of consciousness necessary in order that a stimulus may give rise to sensation at all. Just for this reason, too, there is no law of the 'Persistence of Value,' that would correspond to the physical law of the persistence of force. And just as little does it seem that there can be a law of the 'Persistence of Consciousness.' The whole ideational

content may fall from the greatest liveliness down to nil, while in the corresponding brain-functions the law of the persistence of force maintains its validity. But where then remains the possibility of an even somewhat exact association-psychology?

Nevertheless Mill is right in this, that so far as the doctrine of the succession of ideas can really be empirically based, it has pretensions to count as a science, whatever may become of the basis of ideas and their dependence upon the cerebral functions. The methods hitherto applied, however, give very little guarantee against self-delusions. We have some very general propositions, which rest upon a very incomplete induction, and with these the field of psychical phenomena is traversed in extended analyses, in order to see what may be referred to these supposed laws of association. But if, instead of merely analysing the general notions of psychical phenomena, we will but turn to life and try to comprehend the succession of ideas in particular cases, such as present themselves to the alienist, the criminal lawyer, or the schoolmaster, we shall nowhere make a single step forward, without stumbling upon the 'unconscious ideas,' which, quite in accord with the laws of association, strike into the course of our ideas, although they are, strictly speaking, not ideas at all, but only brain-functions of the same kind as those which involve consciousness.[57]

[57] Some attempt has recently been made (by Stumpf, Brentano, &c.) to eliminate 'unconscious' or 'latent' ideas out of psychology. When recourse is had for this purpose to Lotze, no great objection can be made, for he expressly assumes that the ideas are connected with brain-functions, which without even exciting consciousness yet participate in the course of our thoughts (Medic. Psych. ss. 409, 410). That Lotze at the same time assigns associations (s. 411), not to physiology, but to a 'metaphysical psychology,' is an inconsistency which on closer consideration must easily disappear. The rest is a question of words. There is, on the other hand, assuredly a material error in Brentano, if he proposes to explain everything by ideas which have been conscious but have been again forgotten. Comp. especially the inadequate way in which Brentano tries to dispose of Maudsley's views as to unconscious intellectual labour (Psych. v. emp. St., S. 138 ff.) Precisely Goethe, whose saying that extraordinary talent is only a slight deviation from ordinary

Besides the doctrine of the succession of ideas, we have now yet another department of empirical psychology which is accessible to strictly methodical inquiry. This is Anthropological Statistics, the core of which so far has been formed by Moral Statistics. We find ourselves here quite strictly in the sphere of what Kant called 'Pragmatic Anthropology;' *i.e.*, we have to do with a science of man as a "freely acting being," obviously, therefore, with the intellectual side of man, although statistics does not trouble itself about the distinction of body and soul. It records human actions and human chances, and by combining these records many an insight may be gained into the machinery not merely of social life, but also of the motives which guide the individual in his actions.

In truth, nearly the whole of statistics can be turned to account in exact anthropology, and it is a mistake to suppose that psychological conclusions can be drawn only from reports as to the number and kind of crimes and trials, the extent of suicides or illegitimate births, or the extent of education, the number of literary productions, and so on. By skilful combinations of the numbers to be compared, it must be just as possible to draw psychological conclusions from the statistics of commerce and navigation, from the traffic reports of the railways, goods and passengers both included, from the average quantities of crops and number of cattle, the results of the subdivision of property and of its aggregation, and innumerable other reports, as from the favourite themes of moral statistics. On the other hand, because the variety of

talent, is employed by Brentano against the unconscious labours of genius, has expressed himself so often and so clearly on the unconscious processes from which artistic production proceeds, that we must allow the utmost weight to his testimony. There is nothing in the rarity of great original thinkers, for productive genius is not therefore bound to be rare also. It is found more or less in every artist. A collection of the utterances upon this subject of writers and artists is in J. C. Fischer, Das Bewusstsein, Leipz. 1874 (6 Kap.).

circumstances and motives was not regarded, or because man was regarded too much in the light of an obsolete psychology, results have been often prematurely drawn from the figures of moral statistics. The excellent Quételet has spread many false ideas, especially by the unhappy expression, 'penchant vers le crime,' although with him this term is a tolerably indifferent name for a mathematical idea, in itself irreproachable. Little as a probability arrived at by abstraction can be regarded as an objectively existing quality of an individual thing belonging to the class to which the abstraction was applied, just as little can we expect, by the simple mediation of the calculus of probabilities, to discover a tendency to crime, which, as a real factor in human actions, would have a psychological importance. But the tendency to crime, the inclination to suicide, the propensity to marriage, have been only too often taken literally, and from the remarkable regularity of the figures recurring year by year a fatalism has been deduced, which is at least as strange as Quételet's attempt to save the freedom of the will as well as the reign of law. Quételet, that is to say, allows freewill—of course freewill according to the school-traditions of France and Belgium—its validity within the great sphere of the demonstrated regularity of law as an accidental cause, whose effect, striking in now positively, now negatively, is neutralised by the law of high numbers. It is beyond doubt that there are such individual will-impulses, which now have the effect of adding a unit to the year's budget of volitional acts, now of subtracting one, while the average figure finally balances better than any national budget-calculation. But if now the average will, which approximately represents the great mass of all individual will-impulses, is physically determined by the influences of age, sex, climate, food, kind of labour, &c., should we not conclude then in any other sphere that the individual impulse also is governed by physical conditions? Should we not conclude that it

stands related to the average result only as, *e.g.*, the rainfall of the 1st of May, or any other day, is related to the average rainfall of the year? In fact, then, there is not, scholastic prejudices apart, the slightest reason to assume for these individual fluctuations besides the numerous accidental causes which we can trace physically, another special one which preserves the peculiarity that it is restrained to very narrow limits of operation, and yet within these is independent of the general causal connexion of things. This is a wholly superfluous, and, in fact, uselessly disturbing hypothesis, which would occur to no reasonable man, much less then to a man like Quételet, if he had not grown up in the traditionary prejudices of a modernised scholasticism.

As in Germany we have long been accustomed to the idea of a unity of mind and nature, it is natural that our philosophers were not so much affected by this contradiction between the results of statistics and the obsolete doctrine of the freedom of the will. A. Wagner has thought it necessary, in his admirable treatise on the Regularity in apparently Arbitrary Human Actions (Hamburg, 1864), to make it matter of reproach to our philosophers that they have troubled themselves so little with Quételet and his researches; but this reproach is not quite rightly directed. Men like Waitz, Drobisch, Lotze, and many others, amongst whom Wagner may have tried to find some attention to Quételet, are so far beyond this antithesis of freedom and necessity, that it must assuredly be very difficult for them to throw themselves back to a standpoint, from which a serious problem here still presents itself. We may here refer to what we have said in the section on Kant as to the problem of the freedom of the will. Between freedom as form of subjective consciousness and necessity as fact of objective science, there can as little be a contradiction, as between a colour and a sound. The same vibration of a string gives to the eye the picture of an oscillatory motion, to calculation a par-

ticular number of vibrations per second, and to the ear a single tone. But this unity and that manifoldness do not contradict each other, and if the ordinary consciousness ascribes to the number of vibrations a higher degree of reality than to the tones, there is no great objection. Interesting and useful as are Quételet's pioneering studies, yet for the more enlightened German philosophers they are not so much interesting for their bearing upon the freedom of the will, as the empirical conditionality and strict causality of all human actions, which Quételet does not even venture completely to affirm, since Kant is treated as certain, and to some extent as a well-known and settled fact. It is also quite right that the importance of freedom is maintained against Materialistic fatalism, especially in the sphere of morals. For here it is not enough to maintain that the consciousness of freedom is a reality, but also that the course of ideas involved with the consciousness of freedom and responsibility has just as essential an importance for our conduct as those ideas in which a temptation, an impulse, a natural stimulus to this or that action, comes immediately into consciousness. When, therefore, Wagner supposes that the explanation of the neglect of moral statistics lies in the repugnance to figures and tables, he is decidedly mistaken. How could we look for such a repugnance in Drobisch, who did not shrink from constructing tables for the hypothetical values of his mathematical psychology, and who, in fact, is not only acquainted with Quételet's inquiries, but thoroughly understands and is able to criticise them? And yet how difficult is such a German philosopher to understand, even for scientifically trained readers, if they have not the different systems and their history in a connected view before them! Thus, *e.g.*, Drobisch says, in a short and excellent criticism of the conclusions of moral statistics:* "In all such facts there are reflected not pure natural laws, to which man must

* Zeitschr. f. ex. Phil., iv. 329.

submit as to destiny, but at the same time the moral conditions of society, which are determined by the mighty influences of family life, of the school, the Church, of legislation, and are, therefore, quite capable of improvement by the will of man." Who, unless he had an accurate knowledge of the Herbartian psychology and metaphysics, would not find in this an apology for the old freedom of the will, such as might be expected from a French professor? And yet the human will, even on the system to which Drobisch has adhered, is only a consequence resulting in the strictest causality from the state of the soul, which, again, in the last result, is only produced by its reciprocal action with other real existences. Since then, in his essay published in 1867 on 'Moral Statistics and the Freedom of the Human Will,' Drobisch has discussed thoroughly, and in a way intelligible to every one, the relation of freedom and natural necessity, and at the same time made some very valuable contributions to the methodology of moral statistics.

Wagner might, in fact, have been led by Buckle, whose brilliant studies have more than once been a stimulus to him, to see that German philosophy in the doctrine of the freedom of the will has for once an advantage which permits it to regard these new studies with equanimity; for Buckle stands, above all, upon Kant, adducing his testimony for the empirical necessity of human actions, and leaving aside the transcendental theory of freedom.*

Although all that Materialism can draw from moral statistics has thus been conceded by Kant, and all the rest has been already rejected,[58] yet, for the practical value

* See his note at the end of his first chapter.

[58] How little ethical Materialism is justified in making moral statistics a specifically Materialistic science because of its opposition to the doctrine of Free Will, is shown by the interesting fact that we are indebted for the best treatment of the subject as yet to a strictly Lutheran theologian, who endeavours to support his Christian ethics on this empirical basis; Oettingen, Die Moralstatistik: inductiver Nachweis d. Gesetzmässigkeit sittl. Lebensbewegung im Organismus d. Menschheit: Erlangen, 1868. There is recently a second edition. Of course moral statistics are just as little orthodox and Lutheran as they are Materialistic.

of a Materialistic tendency of the age as against Idealism, it is by no means indifferent whether moral statistics, and, as we would have it, the whole of statistics, is placed in the foreground of anthropological study or not; for moral statistics direct the view outwards upon the really measurable facts of life, while the German philosophy, despite its clearness as to the nullity of the old doctrine of freewill, still constantly likes to direct its view inwards upon the facts of consciousness. Yet it is only by the former method that science can hope gradually to secure achievements of permanent value.

It is true, indeed, that our methods must become much more delicate, and especially our conclusions be more cautious, than they have been with Quételet, and in this respect we may regard moral statistics as one of the nicest touchstones of unprejudiced thinking. Thus, *e.g.*, it is still regarded as an axiom that the number of crimes yearly occurring in a country is to be treated as a measure of its morality. Nothing can be more absurd so soon as we have a notion of morality which rises somewhat above the principle of cunningly avoiding punishment. At least we must begin, if we wish to find a figure proportional to the morality, by dividing the number of punishable actions by the number of opportunities or temptations to punishable actions. It is quite obvious that a certain number of bill-forgeries in a district where bills are much used has not the same significance as the same number in an equally large district where the use of bills is only half as much. But criminal statistics count up only the absolute number of cases, and when they go into comparative figures, they take at most the number of the population as a measure, and not the number of acts or business transactions the abuse of which may lead to crimes. For many kinds of transgressions, moreover, the denominator necessary to fix a correct proportion is not to be had, and yet there is a difference as to their whole moral development between the groups of population that are to be

compared, which forbids our supposing that the proportion of crimes to heads of population in the two cases could have the same ethical and psychological significance. As this point has not been sufficiently considered, I may refer here briefly to the important fact of ethical evolution, which I first developed in my lectures on moral statistics at Bonn in the winter of 1857–58, and since then have found constantly confirmed, although I have never found time to publish them. If we compare the condition of a uniformly living pastoral population, such as we might find in several departments in the interior of France, with the condition of a population which is carried away by the industrial, literary, and political play of mind, in which daily life of itself awakes a greater fulness of ideas, demands actions and decisions, excites doubts and stimulates thoughts, and in which, moreover, the alternations of fortune and misfortune are greater for the individual as well as for the community, and extraordinary crises are frequent, we easily see that in the latter population, as is shown by the mere consideration of their faces, their figures, their dresses and customs, there must be found an infinitely greater difference between individuals, and that each single individual is exposed to a much livelier alternation of influences of all kinds. As now, ethically considered, such an evolution develops noble just as much as ignoble qualities, and provokes extraordinary acts of self-sacrifice and disinterested altruism, or of heroic struggles for the general weal, just as much as, on the other hand, it produces the phenomena of avarice, of egoism, and unbounded passions, we may imagine an ethical centre of gravity for the acts of this population from which certain individual acts deviate, now towards the good, now towards the bad side, and again in the direction of some morally indifferent eccentricity. In a population where the process of evolution has not gone so far, all actions will group themselves more closely round the centre of gravity, *i.e.*, eccentric

and exceptionally noble acts will be proportionately just as rare as very bad ones. As now the law does not trouble itself with the great mass of actions, and only assigns a limit to egoism and to the passions in certain directions, beyond which prosecution and punishment begin, it is quite natural that a population of a higher stage of evolution with the same ethical centre of gravity has a greater number of immoral actions, partly because, reckoning by heads, more decided individual acts of will occur, but partly, too, because the greater eccentricity of the individuals extends farther from the mean in a good as well as in a bad sense, while only a part of the actions of this latter kind are recorded. As a powerful wave, even when the water is low, more easily foams over the dam than a weak wave when the water is higher, so must it be here too with regard to punishable actions.

A farther discussion of this subject is not suitable here; and we content ourselves with showing how far moral statistics are still removed from penetrating into the heart of psychology. All the more important, however, are the outworks; and we must never forget that if only a vigorous criticism sees that the ground is firm beneath our feet, the most trivial details gain a permanent value, while whole systems of speculation, after they have for a moment shed a dazzling light, fall for ever into the sphere of history.

CHAPTER IV.

THE PHYSIOLOGY OF THE SENSE-ORGANS AND THE WORLD AS REPRESENTATION.

We have hitherto seen in every department that it is the scientific, the physical study of phenomena, which is able to throw upon man and his intellectual nature the light of real knowledge, though it may be at first but a few scattered rays. Now we come to the department of human inquiry in which the empirical method has celebrated its highest triumph, and in which, at the same time, it leads us to the very limits of our knowledge, and betrays to us at least so much of the sphere beyond it as to convince us of its existence. This is the physiology of the sense-organs.

While nervous physiology in general at each advance was exhibiting life more and more as a product of mechanical processes, the more exact study of the processes of sensations in their connexion with the nature and mode of operation of the sense-organs leads immediately to show us how, with the same mechanical necessity with which everything else goes on, ideas are produced in us which owe their peculiar nature to our organisation, although they are occasioned by the external world. On the greater or less significance of the consequences of these observations turns the whole question of the thing in itself and the phenomenal world. The physiology of the sense-organs is developed or corrected Kantianism, and Kant's system may, as it were, be regarded as a programme

for modern discoveries in this field. One of the most successful inquirers, Helmholtz, has employed the views of Kant as a heuristic principle, and yet in so doing has only followed consciously and consistently the same path by which others too have succeeded in making the mechanism of sensation more intelligible.

Apparently the unveiling of this mechanism is not unfavourable to the theories of the Materialists. The extension of acoustics by the resolution of the vowels into the effect of co-operating over-tones is at the same time a complement of the mechanical principle of explaining nature. The sound, as product of a number of sensations of tone, still remains as an effect of the movements of matter. If we find the hearing of definite musical tones determined by the resonant apparatus of the organ of Corti, or the position of objects of vision in space determined by muscular feeling in the mechanism that moves the eye, it does not seem as if we were leaving this ground. But now comes the stereoscope and resolves the sensations of corporeality in sight into the co-operation of two sensations of flat surfaces. It becomes probable that even the feelings of warmth and pressure in the organ of touch are compound sensations, which are only distinguished by the grouping of the elements of sensation. We learn that the sensation of colours, the ideas of the magnitude and movement of an object, nay, even the appearance of simple straight lines, are not determined invariably by the given object, but that the relation of sensations to one another determines the quality of each individual one; nay, that experience and habit influence not only the interpretation of sense impressions, but even the immediate phenomenon itself. Facts accumulate from all sides, and the inductive conclusion becomes inevitable, that our apparently simplest sensations are not only occasioned by a natural phenomenon which in itself is something quite other than the sensation, but that they are also infinitely compound products; that their quality is by no means

merely determined by the external stimulus and the fixed constitution of an organ, but by the constellation of the collective accurrent sensations. We see, in fact, how, if our attention is concentrated, one sensation may be completely supplanted by another disparate sensation.[59]

Let us see now how much of Materialism may be retained.

The ancient Materialism, with its main belief in the sensible world, is done for; even the Materialistic conception of thought which the last century favoured cannot stand. If for each definite sensation a definite fibre in the brain is supposed to vibrate, the relativity and solidarity of sensations and their resolution into unknown elementary effects cannot stand, to say nothing of localising thought. But what may very well stand with the facts is the hypothesis that all these effects of the constellation of simple sensations rest upon mechanical conditions which, when physiology has progressed far enough, we may be able to discover. Sensation, and with it our whole intellectual existence, may still be the incessantly changing result of the co-operation of elementary activities, infinite in number and in the variety of their combinations, which may themselves be localised, somewhat as the pipes of an organ are localised, but not its melodies.

We stride away now right through the consequences of this Materialism by remarking that the same mechanism which thus produces all our sensations produces also our idea of matter. But it has here no warranty for a special degree of objectivity. Matter in general may just as well be merely a product of my organisation—must, in fact, be so—as

[59] A special exposition of the points here suggested must be very thorough in order to make the reader in some degree independent of other aids. It is, however, the less necessary, as besides the handbooks of physiology and the larger monographs of Helmholtz, &c., we have also Helmholtz's 'Popular Lectures' (1864 and 1871), besides Wundt's Physiol. Psych., in which all the questions here arising are exhaustively treated. Comp. also Fick, Die Welt als Vorstellung, akad. Vortr., Würzb. 1870; and Preyer, Die fünf Sinne d. Menschen, Leipz. 1870.

colour or as any modification of colour produced by the phenomena of contrast.

Here now we see, too, why it is all but indifferent [60] whether we speak of a mental or physical organisation, and therefore we might so often use the neutral expression; for every physical organisation, even if I can demonstrate it under the microscope or with the knife, is still only my idea, and cannot differ in its nature from what I call mental.

In Kant's days the knowledge of the dependence of our world upon our organs lay generally in the air. The Idealism of Bishop Berkeley had never been got over; but more important and influential was the Idealism of the men of science and the mathematicians. D'Alembert distinctly doubted the possibility of knowing the real objects; Lichtenberg, who loved to controvert Kant, because his nature revolted against even the most completely veiled dogmatism, had understood the one point with which we have here to do, quite independently of Kant, more clearly than any of Kant's own followers. He, who in all his philosophising never forgot that he was a physicist, declares it to be impossible to refute Idealism. To know external objects is a contradiction: it is impossible for man to go outside himself. "When we believe that we see things, we see only ourselves. We can, properly speaking, know nothing of anything in the world except ourselves and the changes that take place in us." "When anything acts upon us, the effect depends not only upon the acting object, but also upon that which is acted upon." [61]

[60] That it is not entirely indifferent, as was said in the first edition, I have been convinced, especially by the way in which recent Kantians persistently speak of the *mental* organisation by which the idea is occasioned, as though this were something separate. It is assuredly, on the contrary, not only more correct in itself, but it also agrees with Kant's view, to see in this "mental" organisation only the transcendental side of the phenomenal physical organisation; the 'Ding an sich des Gehirns,' as Ueberweg used to say. Comp., besides, *supra*, vol. ii. p. 193, note 25.

[61] Lichtenberg's Verm. Schrift. hg. v. Kries, ii. SS. 31, 44.

There is no doubt that Lichtenberg was just the man to exhibit to us the connecting links between these speculative ideas and the ordinary physical theories, but he found for this, as for so much besides, neither time nor inclination. It was only a considerable time after Kant that the first step in this respect was taken in Germany; and clearly as the truth lies here on the one side and error on the other, yet even now imbecile tradition can still transfigure the most trivial error with the glories of empiricism, while a correct observation, which is as simple and significant as the egg of Columbus, is rejected as idle speculation. We refer to the theory of the projection of the object outwards in connexion with the famous problem of Erect Vision.

It was Johannes Müller who first pronounced the true solution of this problem, though without carrying it out in logical completeness, by pointing out that the image of our own body is perceived under entirely the same conditions as the images of external objects.

If men once found it astonishingly difficult to conceive this firm earth upon which we stand, the very type of repose and stability, as in motion, it will be still more difficult for them to recognise in their own body, which is to them the type of all reality, a mere scheme of representation, a product of our optical apparatus, which must just as much be distinguished from the object which occasions it as any other representative image.

The body only an optical image? 'Why we see it,' we can no longer answer, but 'Why we have the immediate sensation of our reality!' 'Away with idle speculations! Who will deny that this is my hand, which I move with my will, and whose sensations are given so immediately to my consciousness?'

These expectorations of natural prejudice might be continued *ad libitum*. The decisive answer is not far to seek. Our sensations, that is to say, must in every case first coalesce with the optical image, whether we concede

that the image of the body is not the body itself, or whether we hold fast to the naïve idea of its identity with the object. A man born blind and then couched must first learn the correspondence of his visual and tactual sensations. We only need here an association of ideas, and this must in any case give the same result, whatever we may think of the reality of the body represented in thought.

Müller himself, as we have said, did not attain to perfect clearness, and we shall be led to think that it was the philosophy of nature, with its fantastic interchange of subject and object, of the ego and the external world, that was still in his way. By way of compensation, the correct observation, because of its colossal paradox, was naturally treated as a philosophical fantasy. Nowadays we may frequently hear the opinion that Müller's treatise on the Physiology of Sight (1826) was an immature first production of the famous physiologist, not yet free from the ideas of the philosophy of nature. We will therefore quote the important passage on Erect Vision from the Handbook of Physiology (1840).

"In accordance with the laws of optics, the images are depicted on the retina in an inverted position as regards the objects. . . . The question now arises whether we really see the images, as they are, inverted, or erect as in the object itself. Since the image and the affected parts of the retina mean the same thing, the question physiologically expressed is this: Are the particles of the retina perceived in vision in their natural relation to the body?

"The view which I take of the question, and which I propounded in my work on the Physiology of Vision, is, that even if we do see objects inverted, the only proof we can possibly have of it is that afforded by the study of the laws of optics; and that if everything is seen inverted, the relative position of the objects of course remains unchanged. It is the same thing as the daily inversion of objects consequent on the revolution of the entire earth,

which we know only by observing the position of the stars; and yet it is certain that within twenty-four hours, that which was below in relation to the stars comes to be above. Hence it is also that no discordance arises between the sensations of inverted vision and those of touch, which perceives everything in its erect position; for the image of all objects, even of our own limbs, in the retina are equally inverted, and therefore maintain the same relative position. Even the image of our hand while used in touch is seen inverted. The position in which we see objects we call, therefore, the erect position. A mere lateral inversion of our body in a mirror, where the right hand occupies the left of the image, is indeed scarcely remarked; and there is but little discordance between the sensations acquired by touch in regulating our movements by the image in the mirror and those of sight; as, *e.g.*, in tying a knot in the cravat, and so on."

This exposition leaves nothing to be desired in clearness and precision, and we emphasize the fact that in the whole passage there is no trace of that fanciful speculation which distinguishes the Philosophy of Nature. If this view is based upon the Philosophy of Nature, then in this instance its influence is to be praised. It is certainly possible that familiarity with abstract philosophy in this instance, at least, has aided Müller by detaching him from unthinking tradition. But where now are the consequences?

For him who has once recognised the simple truth that Erect Vision is not a problem at all, because the visual image of our body stands in precisely the same circumstances as all other images, there should no longer be any question as to a projection of images outwards. For why should all other images lie in the single image of the body, since the objects of the outer world by no means lie in the real body, which, in fact, in relation to our representation, is also outer world? Of a representation of images instead of the represented retina there can thus be no question. This would be the most paradoxical of

hypotheses. How now shall so mythical a phenomenon as the so-called projection contribute to make the external things represented appearing outside the equally merely represented head? To seek here at all for any principle of explanation, one must be at sea as to the whole relation. And Müller, who has so distinctly pronounced the solution of the riddle in his chapter on 'Inverted Vision and Erect Vision,' nevertheless in the next chapter comes back to the theory of projection, and thinks that the idea received in the act of vision "may be conceived as a forward projection of the whole visual field of the retina." Here again then the retina, as conceived and abstracted from images in mirrors and from the appearance of other persons or from anatomical inquiries, is confounded with the actual retina. And Müller could never have relapsed into this confusion, if he had not been entangled in the notions of the Philosophy of Nature as to subject and object. In fact, he says in a previous chapter that the projection outwards of the objects of vision is nothing else than "the discrimination of the objects of vision from the subject, the discrimination of the sensations from the sentient Ego."

Ueberweg has therefore done excellent service not only by bringing once more into view Müller's unjustly neglected remark as to Erect Vision, but also by completely elucidating the relation of the image of the body to the other images of the outer world.* For this purpose Ueberweg employs an interesting illustration. The table of a camera obscura is, like Condillac's statue, endowed with life and consciousness; its pictures are its ideas. It can no more receive an image of itself upon its table than our eye can throw its own image on the retina. The camera might, however, have projecting parts, additions in the nature of members, which should paint themselves on the table and so become an idea. It may mirror other similar constructions; may compare, abstract, and so at length form an

* Henle u. Pfeuffer, Zeitschr. III. Ser., v. 268 ff.

idea of itself. This idea will then take up some place on the table, where the projecting members are usually reflected, or from where these members seem to spring. With admirable clearness Ueberweg has shown that a projection outwards is quite out of the question, just because the images are outside the image, exactly as we must imagine to ourselves the objects setting up sensation as outside our objective body.

A consequence of Ueberweg's conception is that all the space that we perceive is only just the space of our consciousness, while the question meantime remains open whether the retina itself is the sensorium of these visual images, or whether we must seek one further back in the brain.

If we would now suppose for a moment that our sensibility makes no change in things except what we can deduce from the observation of the picture on the retina, there would result, as a probable view of the reality of things, a strange and stupendous idea. Things, including ourselves, are all just inverted as they appear to us, and the whole world which I see lies within my brain. Beyond this the actual things extend in corresponding proportion.

Not in order to free the question from its adventurous aspect (for this has nothing whatever to do with its logical probability), but merely in order to carry the light a step further, we begin by observing that it would be too precipitate to employ the distances of the most distant star as a standard for the measurement of our sensorium. The billions of miles in the calculation of these distances are not a product of our sensibility, but of our calculating reason, and it is only the effect of the association of ideas that the idea of these distances is fused with the sensuous image of the star. To the man born blind who receives his sight by an operation, the objects of visual perception appear oppressively near; the child reaches out for the moon, and even to the adult the figure of the moon or the

sun is hardly more distant than the figure of the hand which covers the moon with a threepenny bit. He merely *interprets* this figure differently, and this interpretation reacts of course on the immediate impression of the objects of vision. The whole elaboration of the idea of space based upon vision is a similar process of association, like the fusion of sensations of taste and of feeling with visual images. To make this still clearer we will add another illustration to that of Ueberweg.

In a good diorama the illusion, as regards the perspective of the picture, leaves nothing to be desired. I see before me the Lake of Geneva, and descry the well-known giant summits of the Ufergebirge and the misty heights in the distance with the complete feeling of the distance and grandeur of this magnificent scenery, although I know that I am at 5 Wolf Street in Cologne, where there is in reality no room for such distances. Now the bell sounds in the chapel, and I combine sound and picture into the unity of that solemn and peaceful impression, which I have so frequently enjoyed in nature.

Now let me suppose that the Ego, the consciousness, or some other imaginary being, sits within the skull, and regards the retinal picture, no matter through what medium, as the picture of a diorama with the most splendid perspective, and at the same time in action like the picture of the camera obscura. The being that I imagine is entirely subject to its intuition; beyond this picture it is not capable of any visual perception whatever: it sees nothing of itself, nothing even of the medium through which it sees. But of course this same imaginary being is capable of other impressions; it hears it feels, and so on. What will happen? The sound will of course very easily fuse with the visual image. If a bell stirs in the picture in some harmony with the corresponding sounds, the association is at once complete. Of itself as hearer and spectator, our supposed being can, of course thus learn nothing.

We go further. Our being shall also feel, but sensation too shall give him only peripheral ideas; nothing of his own condition and his immediate environment in the brain. Now it shall perceive in its diorama a creature whose movements are in complete harmony with its sensations, whose limbs contract when it feels a pain, and extend themselves when it feels a desire. This creature is quite in the foreground of the scene. Its peculiar, imperfectly cohering parts pass frequently like giant shadows over the whole field of view.

Other creatures show themselves smaller in perspective, very similar, but more perfect and coherent, than the great being in the foreground, with whom the sensations of pain and pleasure are so inseparably connected. Our being combines, abstracts; and as it knows nothing at all of itself beyond its sensations, its sensations are fused also with the great imperfect creature in the foreground of the field of view. By comparison with others, however, this creature is in idea retrospectively supplemented. Now then we have Ego, Body, Outer World, Perspective, everything conformable, regarded from the standpoint of a kind of soul, which through the association of ideas comes to an idea of an Ego without knowing anything whatever of its real self. The idea of the Ego is meanwhile, as it is originally with man, quite inseparable from the idea of the body; and this body is the diorama body, the retinal picture body, fused with the body of the sensations of touch, the sensations of pain and pleasure.

Unless the thread of our argument is kept in view, it might be supposed that we were here suddenly coming round to Lotze's punctual soul; but it must be remembered that we were only constructing a fiction. We personified a phenomenon, and this phenomenon is nothing but the fusion of the sense-perceptions themselves. The intermediate person is superfluous. That an entire spiritual life, in the sense in which we are accustomed to use this term, can be built up from the sensations in their infinite

gradation, manifoldness, and complexity, we have already seen. Here it suffices to remark that a unitary connecting point does not seem to us at all necessary in order to allow of the fusion of the functions of all sensoria, in case there are several; if only any connexion is there.

If the individual sensoria in the brain had no connexion, we should have not only a metaphysical riddle before us; but even the mechanical understanding of man as a mere natural creature, as we have pictured him in the chapter on 'Brain and Soul,' would become an impossibility. If, however, a connexion is granted, for which we require no unitary central point nor complete 'images' in the brain, there remains only the metaphysical riddle, how out of the multiplicity of the atomic movements there arises the unity of the psychical image. We hold this riddle, as we have often said, to be insoluble, but so much we can easily see, that it remains equally great, whether we assume a mechanical union of the stimuli into an image in a material centre or not. If we call the act of transition from physical multiplicity to psychical unity a synthesis, then this synthesis remains equally inexplicable, whether it refers to the union of the numerous discrete points of a complete image, or to the mere spatially distributed conditions of the image. The Cartesian and Spinozistic view of the intuition of brain-images by the soul remains, apart from the well-known artifice by which prejudice introduces into man yet another man, every whit as inexplicable as the origin of the psychical image directly from its physical conditions.

Of course if a man stands before a loom, and tries to guess from its mechanism and from the way in which the threads of the chain are stretched the pattern of the tissue, this is more difficult than if he regards the pattern directly on the finished material. As now this perception only takes place through the surface of the material being resolved into a multiplicity of impressions on the particular nerves, and as this resolution is necessary in order to

render possible the greatest manifoldness of connexions with other sense impressions in the brain, it cannot help us at all that somewhere in the brain there should be produced again from these individual impressions a physical image of the material; for this must again be resolved back in order to enter into the mechanism of associations. Accordingly, we may just as easily, and more easily, refer the origin of the psychical image of the intuition which becomes conscious in the subject to a direct synthesis of the individual impressions, even if these are dispersed in the brain. How such a synthesis is possible remains a riddle; indeed, we have reason to suppose that the whole assumption of an origin of the unitary psychical image from the numerous individual stimuli is only an inadequate mode of conception with which we have to content ourselves; but so much may be perceived, that in any case such a synthesis is required in order to establish the link between atomic changes and consciousness. But on this very account there is no sense in repeating things over again in the brain, or, to speak more correctly, for the product of the synthesis, for the representation of a thing, to insert a reduced image over again into the represented brain.

Ueberweg indeed found another way out of the difficulty. He was opposed to Atomism, and the continuity of matter appeared to him too as a sufficient link of unity for ideas. He needed no man in man to perceive the brain-images. He attributed 'consciousness' to these images, and thus the ideas were complete. Of course this involved a presupposition to which anatomy will simply not lend itself. He had to suppose somewhere in the brain a 'structureless substance,' in which the ideational images lie imbedded, and by whose power of conduction in all directions they can be placed in connexion with all other sensations. On this postulate the whole thing goes to pieces, though it may also be attacked at many other points. We will, therefore, again not follow Ueberweg, when, true to his

principle, he assumes a world of things-in-themselves, which has spatial dimensions, which is completely filled with matter capable of sensation, and the things in which we must conceive as only slightly differing from the things of our ideas. In this, however, we must agree with Ueberweg, much as the metaphysicians may struggle against it, that our ideas, so soon as we understand the word not in the sense of 'actus purus,' have *extension*, for the things as they appear are just precisely our ideas. That they are therefore material cannot, however, be asserted, for only the phenomena are given to us immediately; matter all the same, whether we conceive it atomistically or as a continuum, is a factitious principle to aid us in bringing phenomena into an unbroken connexion of cause and effect.

If now we apply metaphysical criticism to Ueberweg's picture of the world, of course this strange colossal world of things in themselves disappears like a cloud-picture; for if space is only our form of intuition, these things in themselves are and remain absolutely unknowable. As soon, however, as we return to the Materialistic mode of conceiving things outside us, Ueberweg's colossal world returns again with all its rights. But as now no feature of Materialism is so generally spread as the belief in material, self-existent things, and the habit of presupposing them, even though we do not believe in them, the paradoxical theory of Ueberweg acquires besides its metaphysical value a didactic value as well. The metaphysical value is limited to Ueberweg's system; the didactic value serves also for any other system, so far as the hypothesis of a material and self-existing world of things is admitted, at least as a conception assisting us to comprehend phenomena. Here, in any case, the false theory of projection is cut off at the root.

Helmholtz remarks that the controversy as to the explanation of erect vision has only the psychological interest "of showing how difficult it is even for men of consider-

able scientific capacity to make up their minds really and truly to recognise the subjective element in our sense-perceptions, and to see in them effects of objects instead of unaltered copies (*sit venia verbo*) of objects, which latter notion is altogether contradictory." Helmholtz rejects the theory of Müller and Ueberweg, without impugning its consistency and relative correctness.[62] We need it, of course, no longer when we have once learned to regard phenomena as mere effects of objects (*i.e.*, of the unconscious things-in-themselves) upon our sensibility; but by far the greater number of our present physicists and physiologists not only cannot rise to this standpoint, but remain still deep in the false theory of projection, which has its roots just in the raising of our own body into a thing-in-itself. To cut off this error at the root there is no better means than the Müller-Ueberweg theory, which then indeed is in its turn abolished from the higher standpoint of the critical theory of knowledge.[63]

[62] Hdbuch d. physiol. Optik, § 29, S. 606 f.; 594.

[63] The relative and didactic merit here assigned to the Müller-Ueberweg theory is not affected by the latest turn which Stumpf (Ueber d. psychol. Urspr. d. Raumvorstellung, Leipz. 1873) has attempted to give to the projection theory. Stumpf is wrong in making it appear that my adhesion to Ueberweg's theory is unconditional (S. 190 Anm.), although the difference of the standpoints, which is now more fully exhibited, was still sufficiently indicated in the first edition, and is, moreover, an obvious consequence of my standpoint in the theory of knowledge. As regards Ueberweg, Stumpf begins with the supposition that he has not observed the distinction between "to represent something as existing at a distance" and "to have one's representation at this distance or to represent it as existing at this distance." But Ueberweg must not be so lightly treated, since his philosophy, despite the singularity of the whole, is thoroughly thought out in all its parts. Precisely the question, What, does it mean to represent something as existing at a distance? may be regarded as the starting-point of his psychological constructions; for Ueberweg found that these words have no sense unless the distance itself is also represented in terms of sense. Only the second proposition, therefore, is in his view clear and appropriate; the first rests on the Scholastico-Cartesian illusion of a representation separable from its content. The way, too, in which Stumpf treats Ueberweg's illustration of the table and camera-obscura (S. 191) rests upon an entire misunderstanding. The image of the table embraces, of course, only its external appearance, without that which is pictured upon it, as we perceive a man from the outside into whose brain we cannot see. To identify the image completely with the proper 'self' of the table can

Not less thoroughly than by the elimination of the old theory of projection, the belief in material things is also shaken by an inquiry into the material out of which our senses construct the world of these things. Any one who does not venture with Czolbe to draw the extreme conclusions of belief in the phenomenal world, will nowadays easily admit that colours, sounds, smells, &c., do not belong to things in themselves, but that they are peculiar forms of excitation of our sensibility, which are called forth by corresponding but qualitatively very different phenomena in the outer world. It would lead us too far to recall the innumerable facts that confirm this doctrine; we must only single out a few which throw their light further than the great mass of physical and physiological observations.

First of all, we remark that the main principle of the sentient apparatus, especially of the eye and ear, consists in this, that from the chaos of vibrations and motions of every kind with which we must suppose the media that surround us to be filled, certain forms of a motion repeated in definite numerical relations are singled out, relatively strengthened, and thus made objects of perception, while all other forms of motion pass by without making any impression whatever upon our sensibility. We must begin therefore by declaring not merely that colour, sound, &c., are phenomena of the subject, but also that the motions in the outer world which occasion them by no means play the part which they must have for us as a result of their effect upon the senses.

The tone so high as to be imperceptible and the no longer audible vibration of the air are not in the object separated by such a gulf as lies between audibility and

occur to no one who seriously tries to do justice to Ueberweg's view. Stumpf's ingenious but hazardous deduction that the visual representation must originally have these dimensions we leave unexamined. But when, in order to simplify the problem of the perception of depth, he avoids the notion of 'outside us,' and instead speaks only of 'seeing things at a distance,' this is not to decide as to the core of the problem of projection; for this turns always on the distance of things from our body and of the *represented* things from the *represented* body.

inaudibility. The ultra-violet rays have *for us* an all but imperceptible importance, and all the numerous phenomena in matter, of which we have only indirect knowledge, electricity, magnetism, gravity, the tensions of affinity, cohesion, &c., exert their influence on the relations of matter just as much as the directly perceptible vibrations. If we think of atoms, these can not only not shine, sound, &c., but they have in fact not even the forms of motion corresponding to colours and tones which we perceive. They must rather have other extremely complicated forms of motion, resulting out of innumerable others. Our sense-organs are organs of abstraction; they show us some important effect of a form of motion, which does not even exist in the object itself.

If it is said that abstraction even in thinking leads to the knowledge of truth, we must observe that this is only relatively true, namely, so far as we speak of that knowledge which necessarily results from our organisation, and therefore never contradicts itself. We turn the tables now by explaining here again, on the Materialistic method, the supposed supersensible, thought, by the sensible. If the abstraction which our sense-apparatus brings about with its rods, cones, fibres of Corti, &c., can be shown to be an activity which, by the elimination of the great mass of effects, creates a wholly one-sided picture of the world depending on the structure of our organs, the same, we may conjecture, will be the case with abstraction in thinking.

Recent observation has discovered very interesting relations between the idea and the apparently immediate sense-perception, and sometimes a somewhat fruitless controversy has been carried on as to whether an observed fact was to be explained physiologically or psychologically. An instance is the phenomenon of Stereoscopic Vision. For the main questions with which we have here to deal, it is quite indifferent whether, *e.g.*, the theory of identical positions of the retina in the explanation of the phenomena holds its place or not. To inquirers of a purely

physical, if not exactly Materialistic, turn of thought, it is unpleasant to resolve a fact of apparently immediate sense-perception into what seems so vague a thing as an 'idea.' They profess to leave such theories to the philosophers, and try themselves to find a mechanism which necessarily produces the thing. But supposing that they had found this, it would by no means be proved that the thing had nothing to do with the 'idea,' but rather an important step would have been taken towards explaining ideation itself mechanically. Whether this explanation lies somewhat further back or not is for the present indifferent; as also whether the mechanism which has yet to be discovered is innate or developed through experience, and varying again with it. It is uncommonly important, on the other hand, that such fundamental points of sensibility as corporeal vision, the phenomenon of brilliance, the concord and discord of tones, and so on, are resolved into their conditions, and shown to be a product of various circumstances. Thus our previous conception of the corporeal and the sensible must gradually become modified. Meanwhile, it is quite indifferent whether the phenomena of the sense-world are referred to the idea or to the mechanism of the organs, if they are only shown to be products of our organisation in the widest sense of the word. As soon as this is shown, not merely with regard to individual phenomena, but with adequate generality, there results the following series of conclusions:—

1. The sense-world is a product of our organisation.

2. Our visible (bodily) organs are, like all other parts of the phenomenal world, only pictures of an unknown object.

3. The transcendental basis of our organisation remains therefore just as unknown to us as the things which act upon it. We have always before us merely the product of both.

We shall soon reach a further series of conclusions;

but first a few remarks on the connexion between sense-impression and idea.

In stereoscopic vision we left it an open question where the mechanism of the phenomena concerned is to be found. We have, however, a group of highly remarkable phenomena in which the intrusion of an inference, and a fallacious inference, into the visual sensation appears unmistakable. As is well known, the spot where the optic nerve enters the eye is insensitive to light; it forms a blind spot on the retina, of which, however, we are not conscious. Not only does one eye supply what the other eye lacks—otherwise every one-eyed person must perceive the blind spot—but another completion also takes place of an essentially different kind.

A uniformly tinted surface on which we put a spot of any other colour appears without any interruption of the ground-colour, if by a proper adjustment of the axis of the eye we make this spot fall upon the blind spot of the retina. The habit of completing a surface thus presents itself here immediately as a sensation of colour. If the ground-colour is red, then, too, on the blind spot we *see*—if the term is properly understood—red also. This sensation cannot be resolved into the abstract hypothesis that this point is not distinguished from the rest of the surface, nor even into an easily distinguishable imaginary picture, but we *see* as clearly as we are accustomed to see with a spot of the retina pretty far removed from the yellow spot the colour which, if it depended merely on the constitution of our external organ at the place in question, could by no possibility appear.

This experiment has been pursued through many variations. A black line is applied to the white surface, and the middle of it is made to fall on the blind spot. The line appears complete, all the same whether it is perfect or is interrupted at the blind place. The eye makes, as it were, a probable inference; an inference from experience, an imperfect induction. We say the *eye* makes this

inference. The expression is intentionally not more definite because we intend briefly to denote by it only that whole group of arrangements and processes from the central organ to the retina, to which is attributed the activity of vision. We regard it as unreliable in point of method to separate in this case inference and sight from one another as two separate acts. We can only do this in abstraction. Unless we give an artificial interpretation to the actual phenomenon, in this case seeing is itself an inferring, and the inference perfects itself in the form of a visual idea, as in other cases it does so in the form of conceptions expressed in language.

That here seeing and inferring are really one is shown by the mere consideration that we simultaneously by the mediation of ideas infer with perfect sureness the opposite of what is given us by the immediate sensible phenomenon. If there belonged to the organ of sight merely the sensation as such, if all inferring took place in a separate organ of thought, we could hardly explain this contradiction between inference and inference, quite apart from the special difficulty of unconscious thinking. This latter difficulty is indeed brought nearer to a general solution if we assume that operations which in their conditions and in their results are identical with inference may be fused into one with simple sensible activity.

How great is, in fact, the unity of inference and seeing in these phenomena is shown by the success of a variation of the experiment, by which, as it were, the eye is made aware of the defectiveness of its premisses. A cross is drawn of different colours, and the point where its two lines intersect, the point of crossing, is made to fall upon the blind spot. Which arm now must the idea complete, since both put in equal claims? It is usually supposed that in this case the colour which makes the liveliest psychical impression asserts itself, or again that there may be an interchange, now the one and now the other arm appearing complete. No doubt, indeed, these phenomena occur, but

they are altogether less distinct than in the simple form of the experiment, and on frequent repetition and variation of the experiment vision at this spot finally ceases altogether. We no longer succeed in seeing either the one arm or the other complete. The eye attains, as it were, the consciousness that there is nothing seen at this spot, and corrects its original wrong inference.

I will not omit to observe here that after long occupying myself with these experiments I saw the primitive freshness of the completed colours and forms fall off; the eye seemed, even in the simpler experiments, also to have become distrustful. After suspending the experiments for some time the original sureness in the completion reappeared.

Drobisch * attached great value to Helmholtz's deduction of the sense-perceptions from psychical activities, which involves, he thinks, nothing less than a "refutation of Materialism." But when Helmholtz shows that the perceptions come about as if they were formed by inferences, then the two following principles may be applied:—

1. We have hitherto always found physical conditions for the peculiarities of perception, and therefore we must conjecture that the analogy with inferences also rests upon physical conditions.

2. If there are in the purely sensible sphere, where organic conditions must be assumed for all phenomena, processes which are essentially related with rational inferences, it then becomes much more probable that the latter also rest upon a physical mechanism.

If it were not that the matter has another and a very different side, Materialism would find in the investigations on this subject only a new support. The time when a thought could be regarded as the secretion of a special portion of the brain, or as the vibration of a particular fibre, is of course gone by. Already we must learn to conceive different thoughts as different forms of activity of the same manifoldly co-operating organs. What now could be more welcome to Materialism than the proof that

* Zeitschr. f. exact. Phil., iv. 334 ff.

on occasion of the sense-perceptions in our body there arise *quite unconsciously* processes which in their result entirely correspond with inferences? Does not this bring the highest functions of the reason a considerable step nearer to an at least partially material explanation? If we come to the Materialists with unconscious thinking, they have, on the other hand, not merely the weapon of sound common sense, which finds a contradiction in an unconscious function of the 'soul,' but they may immediately conclude: What is unconscious must be of corporeal nature, since the entire hypothesis of a soul is based only upon consciousness. If the body can without consciousness perform logical operations which we have hitherto attributed only to consciousness, then it can perform the most difficult tasks that the soul has to perform. There is then nothing to prevent us from attributing consciousness as a property to the body.

The only way which leads surely beyond the one-sidedness of Materialism runs right through its consequences. Let it be assumed then that there is in the body a physical mechanism which produces the conclusions of the understanding and the senses, then we stand face to face with the questions: What is the Body? What is Matter? What is the Physical? And modern physiology, just as much as philosophy, must answer that they are all only our ideas; necessary ideas, ideas resulting according to natural laws, but still never the things themselves.

The consistently Materialistic view thus changes round, therefore, into a consistently idealistic view. We cannot suppose that there is a chasm in our being. We must not attribute certain functions of our being to a physical, and others to a spiritual nature; but we are within our rights if we presuppose physical conditions for everything, even for the mechanism of thinking, and do not rest until we have discovered them. We are, however, not less within our rights when we regard not only the outer world as it appears to us, but also the organs with which we conceive

it, as mere images of the really existent. The eye, with which we believe we see, is itself only a product of our ideas; and when we find that our visual images are produced by the structure of the eye, we must never forget that the eye too with its arrangements, the optic nerve with the brain and all the structures which we may yet discover there as causes of thought, are only ideas, which indeed form a self-coherent world, yet a world which points to something beyond itself. And with all this we have still to inquire how far it is probable that the phenomenal world is so totally different from the world of things that occasion it, as, for example, Kant supposed when he regarded Space and Time as mere human forms of intuition; or whether we may suppose that at least matter with its motion is objectively existent, and the basis of all other phenomena, however widely these phenomena may vary from the real forms of things. Without the objectivity of space and time we cannot possibly conceive anything like our matter and motion. Accordingly it is the last refuge of Materialism to maintain that order in space and time belongs to the things-in-themselves.

If we leave aside here the moral proof for the reality of the phenomenal world as we find it in Czolbe, none of our Materialists has attempted to supply this proof; on the other hand, we find a noteworthy, but, as we are convinced, an unreliable attempt in Ueberweg's Logic (§§ 38 to 44). Ueberweg justly contests the way in which Kant distinguished space and time as *form* of perception from the matter of perception. He starts, then, from the principle that internal perception can apprehend its objects as they are in themselves with material truth. With admirable clearness he distinguishes the nature of sensation from the nature of things by which it is occasioned. Only the nature of the psychical images in our own consciousness can we know, according to Ueberweg, exactly as it is. As now our internal experience runs its course in time, he regards the reality of time as proved. But order in time presupposes

the laws of mathematics, and these presuppose space of three dimensions; and thus the course of the demonstration is completed.

Apart from the fact that the fundamental principle, at least in reference to reproduction, is open to just objections, a decided error seems to me to lie in the transference of the reality of time in us to the reality of time outside us. In us not only has time reality, but space also, without the necessity of the mediation of mathematical laws. Now we must, of course, from the connexion of things in us, necessarily conclude to a corresponding connexion of things outside us; but this connexion need by no means be agreement. As the vibrations of the calculated phenomenal world are related to the colours of the immediately seen world, so too a to us entirely inconceivable arrangement of things might be related to the arrangement in time and space which rules in our perceptions.[64]

Sun, moon, and stars, together with their regular motions, and together with the whole universe, are indeed, according to Ueberweg's own ingenious remark, not images reflected outwards, but elements, portions, as it

[64] Ueberweg has replied to this criticism in the later editions of his 'Logik' and in 'Hist. of Phil.' iii. § 27. As to the reality of time, he observes (comp. § 44 in the 4th ed. of the Logik, hg. v. J. B. Meyer, § 85 Anm.), that it would (in the sense of our criticism) be unjustifiable to transfer time to other things, if it were a mere form of intuition, but that it is a 'psychical reality,' because (as is supposed to be proved in § 40) we necessarily apprehend the mental images immediately presented to us exactly as they are. But 'apprehension' is already a new psychical process, in which the thing apprehended cannot remain unaltered. But the idea of time seems only to appear in such secondary psychical formations. In simple, quite spontaneous intuition, even of objects in motion, as, *e.g.*, passing clouds, a flowing stream, &c., I do not find the least consciousness of time. But if we hold to the simple fact that we represent time to ourselves, as always, therefore the idea of time is really in us, time has in this respect not the least advantage over space, and there is no conclusion by analogy possible to other beings in general, but only, as Kant conceded, to other beings similarly equipped for knowledge to ourselves. Ueberweg's proof for the transcendental reality of space of three dimensions, however, rests entirely on the assertion that a mathematical knowledge of objects would not be possible in the measure in which it is possible for us (*e.g.*, in astronomy), unless the number of dimensions of the self-existent world

were, of our interior. When Ueberweg says that they are images in our brain, we must not forget that our brain too is only an image, or the abstraction of an image, arising through laws which govern our ideas. It is quite in order that, in order to simplify scientific reflexion, we stop as a rule at this image; but we must never forget that we have thus only a relation between the rest of our ideas and the idea of the brain, but no fixed point beyond this subjective sphere. There is no other way whatever of passing beyond this circle but through conjectures, which must then be subject to the ordinary rules of the logic of probabilities.

Now then we see how great the difference is between an immediately seen object and an object conceived on the theories of physics; we see already in the narrow sphere within which one phenomenon can correct and complement the other, what enormous variations the object undergoes when it passes from one medium with its effects into another; must we not conclude there that the passage of the effects of a thing-in-itself into the medium of our being probably also involves important, perhaps incomparably more important, modifications?

The laws of mathematics cannot make any difference in this.

Let us conceive for an instant, in order to see this, a being which can represent space to itself only in two dimensions. It may be conceived quite on the analogy of Ueberweg's animated camera-table. Would there not be given for this being also a mathematical connexion of phenomena, although it could never apprehend the idea of our stereometry? The relatively real space, *i.e.*, our space

agreed with those of the phenomenal world. That even without the fulfilling of this condition some mathematical order of phenomena would be possible, Ueberweg does not at all deny. But in what measure, then, is the world intelligible to us? Astronomy is but a special case, for which, under other conditions, something else might be substituted. For the rest, we have no absolute standard as to what we might demand as regards the intelligibleness of the world, and for this reason alone Ueberweg's standpoint is really based upon a concealed *petitio principii*.

with its three dimensions, as compared with its phenomenal world, would be conceived as 'thing-in-itself.' Then the mathematical connexion between the world that occasions ideas and the phenomenal world of this being would be quite undisturbed, and yet from the projection of surfaces in its consciousness no conclusion can be drawn as to the nature of the things that occasion its ideas.

It will easily be seen that in the same way beings are also conceivable with spatial intuitions of more than three dimensions, although we cannot possibly represent anything of the kind to ourselves.[65] It is superfluous to go on accumulating such possibilities; it is enough completely to establish that there are infinite numbers of them, and that the validity of our intuition of space and

[65] What is here said as to the conceivableness of ideas of space with more or less than three dimensions is taken unchanged from the 1st ed., and is therefore *earlier* than the well-known 'metamathematical' speculations of Helmholtz and Riemann, which have since made so much sensation. To avoid confusion of views, therefore, it must be here pointed out that the text speaks only of the conceivableness of spatial or quasi-spatial intuitions in less or more than three dimensions; the latter especially with reference to intuitions in more than three dimensions, for which we can find, of course, no analogy of any kind in what we call space. We might therefore disclaim the keen censure which Lotze has recently pronounced in his 'Logik' (Leipz. 1874, S. 217) against the misuse of the notion of space for "logical pranks" with four or five dimensions. It is, however, going too far when Lotze exclaims, "Against all such attempts we must be on our guard; they are grimaces of science which terrify ordinary consciousness by utterly useless paradoxes, and cheat it of its rights in the limitation of concepts." Ordinary consciousness has no such right as against science; least of all with the mathematicians, who have long been accustomed to attain their most beautiful results by the most paradoxical generalisations. Compare negative, incommensurable, imaginary, and complex quantities, broken and negative exponents, &c.

The rejection of Dühring, Princ. d. Mechanik, S. 488 f., is also insufficiently based, although it rests on an acute attempt of the author (in the Natürl. Dialektik, Berl. 1865, and first in the noteworthy dissertation 'De Tempore, Spatio, Causalitate atque de Analysis Infinitesimalis Logica,' Berol. 1861) to eliminate the mystical element from mathematics by a sharper apprehension of its conceptions. The 'mystical' element is so much increased in recent mathematics that it is no longer sufficient to criticise particular conceptions. The question must some day be treated as a whole in a philosophy of mathematics, how it is possible that the generalising violation of all the limits of intuition and of real possibility leads precisely to the simplest formulæ, which, when applied to reality, remain absolutely valid What Dühring says, Nat. Dial., S. 162, 163, hardly touches the real problem. On

time therefore for the thing-in-itself appears extremely doubtful. This means, of course, that no Materialism of any kind is any longer maintainable; for even though our inquiry, when directed to sensible intuitions, must with inevitable logic result in showing that for every intellectual excitation there are corresponding phenomena in matter, yet this matter, with everything that is formed from it, is only an abstraction from our representative images. The struggle between Body and Mind is ended in favour of the latter, and only thus is guaranteed the true unity of all existence. For while it always remained an insurmountable difficulty for Materialism to explain how conscious sensation could come about from material motion, yet it is, on the other hand, by no means difficult to conceive that our whole representation of matter and its movements is the result of an organisation of purely intellectual dispositions to sensation.

Accordingly, Helmholtz is entirely right when he resolves the activity of sense into a kind of inference.

We are right, in our turn, when we remark that this does not render the search for a physical mechanism of sensation, as of thought, superfluous or inadmissible.[66]

the other hand, however, it seems precipitate, with Liebmann (cf. ésp. his essay in the Phil. Monatsh., vii. 2 Hälfte, 8 H. S. 337 ff., Ueber d. Phänomenalitat d. Raumes), to employ these mathematical speculations as positive arguments for the phenomenality of space, since they are as yet nothing more than mathematical developments of the mere conceivability of a general idea of space, which includes, as a special form, our Euklidean space.

[66] Brentano, Psychol., i. 144, observes with reference to what is said above as to the inference of the eye in the phenomena of the blind spot, that it is not quite clear whether I really mean to admit a 'mediative process' similar to conscious inference. The matter seems to me to be pretty clear. It is a question of a subsumption under an inductively gained major proposition. The conscious procedure would say then: As often as I have the partial phenomena $X_1, X_2, X_3, \ldots$ there must be before me a uniform surface. Now the phenomena X_1, X_2, X_3 are given; therefore there is a uniform surface before me. The corresponding physiological process would simply be this, that as a matter of habit (depending upon acquired conductive paths), from the irritation of certain parts of the brain by X_1, X_2, X_3, there results always the idea of surface (*i.e.*, the mechanical conditions leading to a synthesis in the idea of surface). If now the phenomena X_1, X_2, X_3, &c., appear, there follows immediately, if we will, the idea of surface in the con-

At length, however, we see that such a mechanism, like every other represented mechanism, must be itself only a necessarily occurring picture of an unknown state of things.

"Even though we cannot perceive the web of the atomistic world with our bodily senses, yet we think of it under the type of intuitive representation, and construe its phenomena in an intuitive way; for what else is it when we remove the necessarily posited atoms into time and space, and explain to ourselves the relations of the masses by their equilibrium and their various motions?

"As matter generally, so too the atoms constituting it are phenomena, representation; and the question is not less justified in regard to the atoms than with regard to representable matter, what they are besides phenomenon, besides representation, what they are in themselves, what there is dating from all eternity that in them has found expression."

With these words Rokitansky prepares the way for the declaration that it is precisely the atomistic theory which

crete case. That is to say, the 'mediation' lies simply in this, that the special case of the minor proposition comes in contact with the already developed mechanism of the major proposition, whereby the conclusion, the seeing of a surface, results of itself. Any other 'mediation' does not seem to me to take place in any other process of inference, unless we include in the process of inference the search for the middle term, *i.e.*, the major, which is applied in this case. This search for the middle term of course falls away in the case before us. The two premisses are at once brought together by a natural necessity.

As to the reproach, extended also to Helmholtz, Zöllner, &c., that we have not made sure whether the explanation from unconscious inferences is the only possible one, and especially that we should not have omitted an attempt to explain the phenomena by the laws of association, the answer to this is, that the very easy and obvious explanation by associations is not all inconsistent with that by unconscious inference. If, let us say, to keep to the above example, on the phenomena X_1, X_2, X_3, the image of a surface must result by the laws of association, this must already often have been combined with these phenomena, and this is identical with the existence of the inductive major, under which the new special case is subsumed. Nay, the consistent association psychologists explain ordinary conscious inference by association! That more exact research does not care to concern itself with these modes of explanation is very natural, as they are, properly speaking, not explanations at all, but only stopgaps for the needed explanations.

supports an idealistic theory of things; and we may add, that precisely the resolution of psychical activity into brain and nerve mechanism is the surest way to the knowledge that here the horizon of our knowledge closes in, without touching the question what mind is in itself. The senses give us, as Helmholtz says, *effects* of things, not true pictures nor things in themselves. But to the mere effects belong also the senses themselves, together with the brain and the molecular movements which we suppose in it. We must therefore recognise the existence of a transcendental order of things, whether this rests on 'things-in-themselves,' or whether—since even the 'thing-in-itself' is but a last application of our representative thought—it rests on mere relations, which exhibit themselves in various minds as various kinds and stages of the sensible element, without our being able to conceive an adequate appearance of the absolute in a knowing mind.[67]

[67] Comp. Der Selbstständige Werth des Wissens, Wien, 1869, S. 35.

FOURTH SECTION.

ETHICAL MATERIALISM AND RELIGION.

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CHAPTER I.

POLITICAL ECONOMY AND DOGMATIC EGOISM.

It might not have been out of place, besides the natural sciences, to submit political economy and the related branches to a close examination; but here we already glide involuntarily over into the sphere of the practical questions, the solution of which forms the result of our critical effort. We examine a science, and we find in its doctrines only the mirror of social conditions; we wish to see where ethical Materialism is nowadays, and we find it developed into a system of dogma unlike anything that Aristippos and Epikuros knew. In place of Pleasure, modern times have put Egoism; and while the philosophical Materialists hesitated in their ethic, there was developed together with political economy a special theory of egoism, which more than any other element of modern times bears on it the stamp of Materialism.

The roots of this phenomenon strike back into the age before Kant and the French Revolution. In Italy, in the Netherlands, in France, the modern spirit of inquiry had long ago subjected commerce, international intercourse, the operation of taxes and imposts, the sources of the prosperity or impoverishment of whole nations, to a

theoretical examination; but it was only in England that the doctrines of political economy developed together with the rising flood of industry and world-wide commerce into a kind of science. Adam Smith, who found only moderate approval for his 'Theory of Morals,' won the most extensive reputation by his 'Inquiry into the Wealth of Nations.' Sympathy and Interest were with him the two great springs of human actions. From sympathy he deduced all the virtues of the individual and all the advantages of society; but after he has found Justice also by a somewhat artificial way, he makes it the true foundation of the state and of society. Inclination between the members of society, friendly regard for each other's good, are beautiful things, but they may be lacking without the state being ruined. Justice cannot be spared; with it every community stands and falls. The 'Theory of Morals' allows every individual in the effort after wealth and honour to exert his powers to the utmost in order to surpass his competitors, so long only as he does no injustice; in the doctrine of the 'Wealth of Nations,' the axiom is completely asserted that every one in pursuing his own advantage at the same time furthers the good of all. But the Government has nothing further to do than to maintain all freedom for this struggle of interests.[1]

[1] The two main works of Adam Smith have often been improperly separated, and the 'Theory of Morals' treated as a comparatively unimportant first production, which may be quite left out of account when we come to the 'Wealth of Nations.' That the fundamental idea of both treatises ripened side by side in Smith's mind has been conclusively shown by Buckle (Hist. Civil., c. xx.), and, moreover, Smith himself declares in the preface to one of the later editions of the 'Theory of Morals' that both works sprang from a common plan; that the 'Wealth of Nations,' however, forms merely a fragment of a comprehensive social and political work which was intended to follow the 'Theory of Morals.' At the same time we may doubt, with Lexis (Französ. Ausfuhrprämien, S. 5), whether Adam Smith consciously so employed the method of abstraction as in one world to make man act only from egoism, in the other only from sympathy. Buckle, who tries at some length to establish this view, finds in this procedure an advantage over the induction which starts from the facts. By simplifying the principles, the application of the deductive method is rendered possible, and the fault of one's idleness is supposed to be corrected by starting from dif-

Starting from these principles, he reduced the play of interests, the marketing of Supply and Demand, to rules which even yet have not lost their importance. All the time, this market of interests was not with him the whole of life, but only an important side of it. His successors, however, forgot the other side, and confounded the rules of the market with the rules of life; nay, even with the elementary laws of human nature. This cause indeed contributed to give to political economy a tincture of strict science, by greatly simplifying all the problems of human intercourse. This simplification consists, however, only in this, that men are conceived as purely egoistic, and as beings who can perceive perfectly their separate interests without being hindered by feelings of any other kind.

And, in fact, not the slightest objection could be made to this, if these assumptions had been made openly and expressly for the purpose of giving an exact form to theories

ferent principles, so that the reality would be composed of those influences which, according to the 'Theory of Morals,' result from sympathy, and those which, according to the 'Wealth of Nations,' result from egoism. In answer to this view of Buckle, Lexis briefly points out that human motives cannot be added and subtracted, but that by their very co-operation they become different from what they are in themselves. But in fact, too, Smith has not at all concerned himself with this methodological question. Indeed, even in the 'Theory of Morals' we can everywhere read between the lines that the actions of man are essentially egoistic, and only modified by the effect of sympathy. In the 'Wealth of Nations,' then, Smith deals with a department in which, in his view, the direct effects of sympathy are = nil, and only the indirect effects come into view, *i.e.*, the protection of right by the state. Comp., *e.g.*, the following utterance in the 'Theory of Morals,' Pt. II. sect. 2, chap. ii.: "In the race for wealth and honours and preferments, he may run as hard as he can, and *strain every nerve and every muscle in order to outstrip all his competitors.* But if he should jostle or throw down any of them, the indulgence of the spectators is entirely at an end." This agrees very well with the notion that in the race of all individuals for wealth, so long only as justice is maintained, the whole at the same time comes nearest to the goal of wealth. The social evils resulting from this competition for wealth Smith did not perceive in their full extent—to which, indeed, his own theory conduced in no small degree—and so far as he knew them he regarded them as immutable. He knew of no form of sympathy which could successfully combat these evils, and therefore, too, he had nothing more to say of sympathy in this section of his social and political work. If we had the whole work, we might perhaps find it to be otherwise in other sections.

of social intercourse, by imagining the simplest possible cases; for it is precisely by abstraction from the entire, manifoldly complicated reality that other sciences too have succeeded in gaining the character of exactness. Only that is exact to us, since we cannot embrace the infinite extent of nature's operations, which we ourselves make exact. All absolute truths are false; relations, on the contrary, may be accurate. And what for the advancement of knowledge is most important; a relative truth, a proposition which is only true on the basis of an arbitrary presupposition, and which deviates from entire reality in a carefully defined sense—just such a proposition is incomparably more capable of permanently advancing our comprehension than a proposition which endeavours at one stroke to come as close as possible to the nature of things, and in doing so carries with it an inevitable and, in their full range, unknown mass of errors.

As geometry, with its simple lines, surfaces, and bodies, helps us forward, although its lines and surfaces do not occur in nature, although the mass of real things is almost always incommensurable; so too abstract political economy may help us forward, although there are in reality no beings who follow exclusively the impulse of a calculating egoism, and follow it with absolute mobility, free from any hindering emotions and influences proceeding from other qualities. Of course abstraction in the egoistic political economy is much more thorough than in any other science, since the opposing influences of indolence and habit, as well as those of sympathy and of the sense of community, are extremely important. Yet abstraction may be boldly ventured, so long as it remains in our consciousness as such. For when we have found how those mobile atoms of a society encouraging egoism, which is hypothetically assumed, must behave on our supposition, we do not merely gain a fiction which is consistent in itself, but also an exact knowledge of one side of human nature, and of an element which in society, and especially

in commercial intercourse, plays an extremely important part. We might at least know how man comports himself in so far as the conditions of his activity correspond with the supposition, even although this will never be completely the case.[2]

Materialism in the sphere of political economy consists simply in confounding this abstraction with reality; and this confusion took place under the influence of an enormous predominance of material interests. The English cultivators of political economy started to a large extent from thoroughly practical points of view; 'practical,' not in the old Greek sense, in which vigorous activity from moral and political motives in particular earned this honourable name. The character of those times led men to seek all the true aims of action in the interests of the individual. The 'practical' point of view in political economy is that of a man with whom his own interests are the first thing, and who therefore supposes that it is the same with everybody else. The great interest of these times, however, is no longer, as in antiquity, immediate Enjoyment, but the Accumulation of Capital.

The love of pleasure with which this age is so much reproached is, on a comparative view of the history of civilisation, not nearly so prominent as the passion for work in our industrial chiefs and the compulsion to work

[2] The great mass of our German political economists may be divided, according to their tendency and also their attitude to scientific method, into two classes: those who favour deduction without knowing that it rests on abstraction; and those who avoid abstraction and wish to start from actual facts, but are not able to use the inductive method. Lexis forms a brilliant exception, and in every respect, from the elements of logic to mathematical demonstration, shows himself a master of scientific method. The slight regard which has as yet been shown to his classical work on the 'Französische Ausfuhrprämien,' Bonn, 1870, is one of the clearest tokens of the slight scientific depth of our political economists, as well of the 'Free-trade school' as of the 'Socialists of the Chair.' Lexis regards the whole deductive political economy as a mere preliminary attempt to ascertain our bearings, which must be followed by a real science, essentially based upon statistics. This view perhaps goes too far, but at least the relation of deduction and induction will depend upon the measure in which we attain really valuable inductive investigations.

in the slaves of our industry. Very often, indeed, what seems to be noisy or senseless joy in frivolous amusements is nothing but a result of immoderate, galling, and brutalising labour, since the mind, by perpetual hurrying and scurrying in the service of money-making, loses the capacity for a purer, nobler, and calmly devised enjoyment. Men then involuntarily pursue their recreation also with the feverish haste of acquisition, and pleasure is measured by its cost, and is hurried through as if it were a kind of duty in the days and hours set apart for it. That such a state of things is not healthy, and can hardly exist permanently, seems obvious; but it is not less clear that in the present industrial epoch enormous achievements are accomplished, which at a future time may well serve to make the fruits of a higher culture accessible to the widest circles. What formed the shadow side to the cultured and intellectual enjoyment of Epikuros and Aristippos, the self-sufficient limitation to a narrow circle of friends, or even to one's own person, does not very often appear in our days even amongst wealthy egoists, and a philosophy based upon it would hardly succeed in gaining any general significance. To accumulate the means for enjoyment, and then to devote these means, not to enjoyment, but for the most part to further acquisition, this is the prevailing character of our time. Were all those who have acquired a more than moderate fortune to retire from business life, and henceforth devote their leisure to public affairs, to art and literature, and, in fine, to a cultured enjoyment of life upon moderate means, not only would these persons lead a more beautiful and worthier existence, but there would also be secured an adequate material basis to maintain permanently a nobler culture with all its requirements, and thus to give a higher content to our present epoch than that of classical antiquity. It may be, however, that a larger amount of capital would thus be drawn from business than is drawn as it is by the most irrational luxury; and perhaps this culture could only

really profit a small portion of the population. At all events, as it now is, things are sad enough for the great mass of the population. If all the gigantic force of our machines and all the achievements of human hands, so infinitely perfected by the division of labour, were devoted to securing for every one what is necessary to make life tolerable and to find means and leisure for the higher development of the mind, it might perhaps even now be possible, without prejudice to the intellectual task of humanity, to diffuse the blessings of culture over all classes; but so far this has not been the tendency of the age. It is true that forces on forces are created, new machinery continually devised, new means of communication invented; it is true that the capitalists, who have the means at their command, are ceaselessly active in creating, instead of enjoying the fruits of their toil in dignified leisure; but, nevertheless, the constantly increasing activity aims directly at anything rather than the furtherance of the common weal. Where the intellectual capacity of enjoyment is lacking, there are found *wants* which ever increase more rapidly than the means of satisfying them.

It is a favourite principle of the ethical Materialism of our days, that a man is all the happier the more wants he has, if he has at the same time sufficient means for their satisfaction. All antiquity was unanimously of the contrary opinion. Epikuros, no less than Diogenes, sought happiness in freedom from wants, although the former had happiness, the latter freedom from wants, principally in view. In our days, of course, the exacter knowledge of the life of the people, and especially the statistics of mortality, disease, &c., have refuted the old fable of the contented and healthy poor, and the always hypochondriacal and weakly rich. We measure the value of earthly goods by the scale of the tables of mortality, and we find that even the anxieties of crowned heads are not nearly so prejudicial to health as hunger, cold, and ill-ventilated dwellings. On the other hand, however, the sciences

have advanced sufficiently to allow of an inference of probabilities which absolutely contradicts this Materialistic principle. The history of civilisation shows us that in the times when princesses slept in walled niches, took long journeys on horseback, and made their breakfast off bacon, bread, and beer, the happiness of these persons did not seem less to their contemporaries than to-day, when they fly through Europe in splendid saloon carriages, and at every point have the products of every zone at their command. The analogies of psycho-physics make it very probable that the feeling of personal happiness is just as relative as the feelings of the senses: it is the *difference* that is perceived; it is the *increase* that is felt, and that is measured by the quantity that previously existed.[3] In fact, no reasonable man will believe that the physical structure of rich Brussels lace can contribute more to the happiness of a person adorned with it than any other ornament which sits comfortably and pleases the eye, though it may be of comparatively no value. And yet the possession of these laces may become a 'want;' the impossibility of getting them may produce the liveliest vexation; their sudden loss may be the cause of tears. It is clear that here the comparison, the struggle for pre-eminence, plays the most essential part; and from this it results at once that at least this one kind of want, the want to surpass others, is capable of increasing *ad infinitum*, without anything being gained for the well-being of any one concerned that is not lost to the others. From this it further irrefragably results that a continuous increase of the productions of wealth and of the means for the production of wealth is conceivable without the enjoyment of any man being essentially heightened, and without the labouring masses being brought a single step nearer to the goal of obtaining what is most necessary for an existence worthy of man. Such an increase of the wants

[3] For more on this point see the chapter on Happiness in my book 'Die Arbeiterfrage,' 3 Aufl., S 113–132 and notes.

of all those who can satisfy them, in consequence of the failing sense of community and exorbitant pleonexia, is, in fact, one of the characteristics of our time. The commercial and industrial statistics of most countries show irrefutably that an enormous development of power and wealth is taking place, while the circumstances of the labouring class show no decided advance, and without the haste and greed of acquisition in the propertied classes being in the slightest degree moderated. We live, in fact, not for enjoyment, but for labour and for wants; but amongst these wants that of pleonexia is so overbearing, that all true and lasting progress, all progress that might benefit the mass of the people, is lost, or, as it were, gained only incidentally.

We may now reconcile ourselves to this in itself very unjoyous fact, if we think that sooner or later, in one way or another, an altered tendency will establish itself, while the forces of production remain, for the most part, unaffected. The view might again assert itself, which was the foundation-stone of classical culture, that there is a certain Measure which is most wholesome in all things; and that enjoyment depends not on the *quantity* of satisfied wants and the difficulty of satisfying them, but on the *form* in which they are produced and satisfied, much as physical beauty is determined, not by masses of material, but by the observing of certain mathematical lines. Such a revolution of views would lead from ethical Materialism to Formalism or Idealism; it would be inconceivable without the elimination of our luxuriant pleonexia, and must, moreover, arise from a magnificent revival of the sense of community.

Political economy has so far made little effort to reduce the *distribution of wealth* to correct principles. Rather, in this respect, it took the result arising from the relation of capital and labour as a datum, and merely occupied itself with the question how the greatest possible quantity of wealth is produced. This Materialistic view of the sub-

ject harmonises completely with the recognition of Egoism, and with the defence or toleration of pleonexia. It is attempted to show that the progress produced by the restless struggle of Egoism always to some extent improves the position of the most depressed strata of the population, and here is forgotten the importance of that comparison with others which plays so great a part among the rich. In face of the most crying absurdities a sort of pre-established harmony is imagined, thanks to which the most favourable result for the sum of people comes about through every man's recklessly pursuing his own interests. Though this nowadays chiefly happens with the consciousness of being in the wrong which marks all apologists, yet it happened at the time of the first development of political economy with an unmistakable *naïveté*. It was the universal practice in the last century to deduce the good of the whole from the co-operation of all egoistic effects. However easy, too, it was to protest against the exaggerations in Mandeville's notorious 'Fable of the Bees' (1723), yet the principle that even vices contribute to the general good, was to some extent a secret article of enlightenment which, though seldom mentioned, was never forgotten,[4] and in no department is the appearance of truth so great for such a principle as just in that of political economy. The sophisms of Helvetius in the glittering garb of rhetoric are yet easily seen through; and every attempt to explain even the virtues of patriotism, of self-sacrifice for one's neighbour, and of bravery, from the principle of self-love, must be shattered on the fact that the natural understanding, agreeing with scientific criticism, contradicts it. It is otherwise in political economy.

[4] On Mandeville's 'Fable of the Bees,' see the First Book, especially note 75, third section (vol. ii. p. 79). Worthy of mention, moreover, is the strikingly mild and comparatively approving judgment of Mandeville in the 'Theory of Morals,' pt. vii. sec. ii. chap. v., where it is shown that the 'Fable of the Bees' could never have caused so much excitement if it did not contain truths which were only disfigured by exaggeration. Mandeville's chief mistake was in this, that, in agreement with certain popular ascetic notions, he conceived every passion as at once a vice.

Its tendency has been from the first directed to the furtherance of the people's material welfare, and here it seems so natural to assume that the progress of the collective whole is simply the sum of all the progress of the individuals; but the individual—so much the mercantile experience of all times seemed indubitably to show—can only attain to material prosperity by the reckless pursuit of his own interests; let virtue then be exercised in other spheres, so far as our means admit!

If from the first political economy had only been based upon Egoism, in order by temporary abstraction from other motives to obtain a hypothetical and, within the limits of the hypothesis, an exact science as a first step to fuller knowledge, then there could be no question of a blameworthy Materialism in this sphere. Instead of that, the practical maxims of mercantile acquisition in daily life were transferred wholesale to nations. The question of the material advancement of nations was separated from the ethical questions exactly as these have long been separated in life and business intercourse. Regard was had not to the form of the relations of possession, but to the quantity and the commercial value of wealth; and instead of asking how man *would* act if he were only egoistic, it was asked how *does* man act in the sphere in which Egoism alone is decisive. The former question is that of the exact theorist; the latter that of popular practice, which has nowhere striven so zealously to choke true science as in political economy.

The idea that there is a special department of life for pursuing our interests, and again another for the exercise of virtue, is even yet one of the favourite ideas of superficial Liberalism, and in widely spread popular writings, such as Schulze's 'Arbeiterkatechismus,' it is quite openly preached.[5] Indeed, it has been made into a sort of theory

[5] Comp. Capitel zu einem deutschen Arbeiterkat., Leipz. 1863, S. 49 f., the deduction of commercial progress from the self-interest which is explained as "the love which every one has for his own Ego;" further, S. 91 ff., the regulation of "brotherliness" as an economical principle. At S. 93 we find: "Sie (die Brüderlichkeit) beginnt da, wo das Wirth-

of duty, which expresses itself in daily life much oftener than in literature. Any one who omits to pursue a debtor, if necessary, with all the rigour of the law, must either be a rich man, who may indulge himself in that sort of thing, or he incurs the severest blame. This blame is directed not merely against his intelligence, against his weakness of character or superfluous good-heartedness, but precisely against his morality. He is a frivolous, negligent fellow, who does not look properly after his interests; and if he has a wife and children, even though they are not in want of anything, he is an unconscientious paterfamilias. But just in the same way, too, is regarded the man who devotes his energies to the public good to the detriment of his private fortune. He who does this with special success receives, indeed, absolution and general applause, all the same whether his success is due to chance or to his own energy; but so long as this *vox Dei* of the mob and the fatalists has not been pronounced, the ordinary judgment maintains itself. It condemns the poet and artist as well as the scientific inquirer and the politician; and even the religious agitator only meets with recognition if he succeeds in founding a church, or creating a great institution of which he becomes director, or if he rises to ecclesiastical dignities; but never if, without hope of compensation, he sacrifices a position to his convictions.

It is obvious that we are here only characterising the feelings of the great mass of the propertied classes, which, however, through their having been developed into a system of daily life, also exert their influence even upon those who personally are not without nobler impulses. Before, then, we can more precisely determine the value of this dogmatic system of Egoism, it is indispensable to consider the source of natural Egoism and the origin of

schaften und der Staat aufhört; nicht der Erwerb, nicht Recht und Pflicht sind ihr Reich, nicht der Zwang ist ihre Macht, sondern die freie Liebe."

Comp. on this passage my essay, Mill's Ansichten über die sociale Frage, Duisb. 1866, S. 14 ff.

the counteracting impulses in the light of the principles which we have acquired in the previous sections.

If it is true that our own body is but one of our representative images, like all others; if accordingly our fellow-men, as we see them, are, like all nature about us, in a very definite sense parts of our own being, where does Egoism come from? Obviously, in the first place, from this, that the ideas of pain and pleasure and our impulses and desires, for the most part, are fused with the image of our body and its movements. The body thus becomes the central point of the phenomenal world; a relation which, as we may certainly assume, has also its foundation in the nature of things in themselves.

Without following these indications further, we must first point out that all ideas involving pleasure and the contrary by no means have direct reference to our body. The more refined pleasure of the senses, delight in the beautiful especially, fuses not with the representative image of the body, but with that of the object. Only when I close the eyes with which I have been gazing upon a splendid landscape, do I become conscious of the relation of these objects to my body. What the poet says of absorption in intuition, of abstraction in contemplation, is physiologically and psychologically much more correct than the ordinary projection-theory of so-called scientific observation. Accordingly, the much-abused pleasure of the senses forms in itself a natural counterpoise to absorption in the Ego, and only by means of reflexion can it again afford nourishment to Egoism.

Much more important, however, is moral development through the contemplation of the world of man and occupation with its phenomena and problems. Absorption in this object, as it is likewise presented to us by the senses as part of our own nature, is the natural germ of all that is imperishable and worthy of being preserved. Adam Smith may have had a vague sentiment of this when he based morality upon sympathy; but his concep-

tion was much too narrow. At bottom he had in his view only those cases in which we interpret the gestures and movements of our fellow-men through recollections or by imaginations of pain and pleasure, in accordance with what we have felt ourselves. But in this there is a latent reference to egoistic motives which co-operate only secondarily and indirectly, while the silent and continuous transference of our consciousness to the object of this human world of phenomena, forms the true source of moral elevation and eliminates the preponderance of Egoism.

These suggestions will enable every reader to work out for himself, how the same advance of civilisation which in epochs of maturity produces Art and Science, also conduces to the bridling of Egoism, the development of human sympathy, and the predominance of common aims. In a word, there is a natural moral progress.

Buckle in his famous work on the 'History of Civilisation' has employed an inaccurate point of view in order to prove that the actual progress of morality, like that of civilisation generally, rests essentially upon *intellectual* development. If it is shown that certain elementary principles of morality have not essentially changed from the days when the Indian Vedas were composed until now, we may similarly point to the elementary principles of logic, which have likewise remained unchanged. We might indeed maintain that the fundamental laws of knowledge have remained the same from immemorial time, and that the fuller application of them which has been made in modern times is to be ascribed to essentially *moral* grounds. It was, in fact, *moral* qualities which led the ancients to think freely and independently, but to content themselves with a certain amount of knowledge, and to lay more stress on the perfection of the individuality than on one-sided advancement in knowledge. It was the *moral* characteristic of the Middle Ages to form authorities, to obey authorities,

and to limit free inquiry by traditional formulas. The self-abnegation and determination with which, at the beginning of the modern epoch, Copernicus, Gilbert and Harvey, Kepler and Vesalius pursued their aims, were moral in their nature. Nay, an analogy may even be established between the moral principles of Christianity and scientific procedure; for nothing is so earnestly desired by the men of science as abnegation of their fantasies and hobbies, deliverance from surrounding opinions, and entire devotion to their object. We may say of the greatest inquirers, that they must die to themselves and to the world in order to lead a new life in communion with the revealing voice of nature. Yet we will not here pursue these ideas further. We have exhibited the companion-piece to the one-sided view of Buckle. In truth, neither is intellectual progress essentially a result of moral progress, nor the converse; but both spring from the same root, absorption in the object, the loving comprehension of the whole phenomenal world and the natural inclination to shape it harmoniously.

But as there is a moral progress, resting upon the fact that the harmony of our picture of the world gradually obtains the preponderance over the wild disorders of impulse and the more violent feelings of pleasure and pain, so too the moral ideals progress, according to which man shapes the world about him. Nothing can be more wrong than for Buckle to deduce the progress of civilisation from the co-operation of a variable—intellectual—element and a stationary—moral—element. If Kant has said that we are no further advanced in moral philosophy than the ancients, he has said much the same thing of logic too; and this observation has little to do with the progress of the moral ideals which affect whole epochs of time. What a world of difference there is between the ancient and the Christian notion of virtue! To repel wrong and suffer wrong, to revere beauty and to despise beauty, to serve

society and to flee society, are not merely accidental traits of opposite dispositions with similar moral principles, but are antinomies proceeding from utterly and fundamentally different principles of morality. Christianity altogether was, from the standpoint of the ancient world, distinctly immoral, and would have seemed yet more so, but that the moral ideal of antiquity was already breaking up, when these new and strange principles made their appearance. A similar dissolution of moral ideals and preparation for a new and higher standpoint seems at present to be going on, and this makes it more difficult, and at the same time more important, to mark the position of dogmatic Egoism as it shows itself in political economy and in the principles of social intercourse.

It might appear, for an instant, as though this very dogmatic Egoism were the new ethical principle that is destined to replace the principles of Christianity. The Rationalism of the last century, which merely coquetted with physical Materialism, adopted ethical Materialism. The development of material interests has gone hand in hand with the decline of the old ecclesiastical powers. The development of the natural sciences has operated here destructively, there constructively; but with the building up of material interests went on, step for step, the growth of the theory of political economy, and with this dogmatic Egoism. It might therefore seem as though it were one and the same principle which had acted destructively as regards the traditional forms of Christianity, and positively in reference to the material development of the present age; and as though this at once dissolving and newly creating leaven was the principle of Egoism.

We have already seen above how strongly in political economy appearances favour the higher justification of Egoism, and if without idle sophistry it is impossible to base such virtues as patriotism, self-sacrifice, and so on, upon this principle, it is perhaps quite possible to dispense with these virtues. We must for a moment ac-

quiesce in the idea that the prosecution of selfish interests may in the future become the sole motive of human actions; though Voltaire and Helvetius were decidedly wrong in declaring it to be so already, and in denying any other spring of human action than self-love. And we cannot deny that it is at least not *a priori* inconceivable that such a principle—a very different one from Mandeville's!—may result not from decay, but, on the contrary, from moral and intellectual progress. This is a point that requires the most careful and impartial examination, and can by no means be decided in accordance with a preconceived opinion; and, in order to avoid misunderstanding, we will at once bring into the true light the most paradoxical aspect of the matter. It will easily be conceded that intellectual progress might contribute to make Egoism at once more general and harmless, and even useful; but how could moral progress, and moral progress too in the particular sense which we have just insisted on in speaking of Buckle, assist in making Egoism a general principle, while the whole essence of this progress is to lead us beyond the Ego towards the universal?

The answer to this question brings before us at a stroke the consequences of the most widely spread theory of political economy.

If, that is to say, it is true that the interests of the whole are best served when the least care is intentionally taken for the whole, when individuals most uninterruptedly prosecute their own interests, then the exclusive prosecution of our own interests in practical life will be

1. A result of ripe insight;
2. A virtue, and, indeed, the cardinal virtue.

The repression of those impulses, which would mislead us into self-denying altruism, will become the most essential part of self-conquest, and the form necessary for this self-conquest will be given from looking upon the mechanism of the great whole, whose harmony is dis-

turbed, if we follow those emotions of our heart, which were once praised as noble, unselfish, and magnanimous. Those emotions of sympathy arising from devotion to the object are in turn abolished by the devotion of the spirit to the greater object, to the mechanism animated by harmonious Egoism of the whole world of humanity.

When the question has thus been clearly put, it will also be seen that its decision is not so easy. Who does not call to mind how often he has controlled himself to refuse a beggar, because he knows that alms only feed misery, as oil feeds a flame? Who does not remember the many attempts to make men happy which have ravaged the earth with blood and fire, while in nations where every one cared for himself wealth and prosperity developed themselves? So much must, in fact, be at once admitted that sympathy may lead to wrong, as well as Egoism, and that consideration for the greater whole will forbid many actions that might result from sacrifice for a smaller whole or for individual persons. It might now, of course, be easily objected that such a consideration for the great whole is not Egoism, but the contrary; yet this objection can just as easily be refuted.

If, that is to say, the doctrine of the harmony of separate interests is true; if it is true that the best result for the community is reached if each man cares most uninterruptedly for himself, then it is inevitably true also that it is most profitable for each man to pursue his own interests without wasting or losing time in useless reflexions. The naive egoist is in a state of innocence and does right unconsciously; sympathy is the moral Fall; and the man who must remind himself of the mechanism of the great whole, in order to come back to the same virtue which a crude thinker practises in simplicity, only comes back by a roundabout course necessarily based upon human nature to the point at which the childhood of humanity started. In this way Egoism may have been purified, softened, enlightened; it may have learned more

correct means of advancing its own welfare, but its principles, its essence, are what they were in the beginning.

The questions whether dogmatic Egoism teaches the truth, and whether political economy is in the right path in the one-sided development of the doctrine of free trade, are both determined by the question whether the idea of the natural harmony of interests is a mere figment or not; for the extreme free-trade theorists have not hesitated to base their doctrine on the supreme principle of *laissez faire*. But they have set up this principle not merely as a defensive maxim against misgovernment, but as the necessary consequence of the dogma that the sum of all interests is best cared for when each individual cares for himself. If this dogma is once so deeply rooted as to outweigh all opposite considerations, we need no longer wonder that the name 'nation' is described as a mere grammatical notion, and that on the one hand the protection of navigation by ships of war is rejected (Cooper, 1826), while on the other, the bloody conquests of an adventurer are regarded merely as a specially difficult and therefore specially profitable form of labour (Max Wirth).[6] Both views spring from the same source; from the purely atomistic conception of society in which all motives ordinarily called moral drop out and can only be restored again by an inconsistency.

We have already seen that the purely atomistic conception of society, as enabling us to gradually approximate to the truth, has much in its favour, while as a dogma it is false. Here we must now add the remark that the theory of Egoism and of the natural harmony of all interests has, in its practical application, brought about great advances in civilisation. Enlightened Egoism, it cannot be denied, is as much a principle of social order as many other principles that have had their day, and for

[6] On Cooper, comp. Roscher, Volkswirthschaft, § 12, Anm. 2. The passage from Max Wirth is in the section on Ground-rent, Nationalök., i. 2, 9.

certain transitional periods perhaps the soundest, without our being therefore obliged to attribute to it a higher significance. The system of Free Trade has given a prodigious impulse to the production of civilised peoples. Speculation, though in the first place pursuing its own interests, has so greatly contributed to provide Europe with the means of communication, to regulate commerce, to give a more solid and real character to business, to keep down the rate of interest, to extend and consolidate credit, to limit usury, to make fraud more uncommon, that no prince, no minister, no philosopher, no philanthropist, actuated by the principle of self-denying activity, of benevolent instruction, of wise legislation, could exert anything like the same influence that has been exercised by the gradual removal of the barriers that opposed themselves to the free activity of the individual in the feudal arrangements of the Middle Ages. Since the existence of poor-rates—the introduction of which was indeed the result of another principle—more benevolent institutions and more thorough-going improvements have sprung from the desire not to let these rates rise too high, than could ever have been formed through sympathy or the active recognition of a higher duty. Nay, we may even conjecture that a five- or six-fold repetition of great and bloody social revolutions, even at intervals of centuries, would at last check the pleonexia of the rich and mighty by fear more effectually than it could ever be done by devotion to common interests and by the principle of love.

First we must remark that the great advances of modern times have not, after all, been brought about by Egoism as such, but by the liberation of efforts for private ends as against the suppression of the Egoism of the majority by the stronger Egoism of the minority. It was not fatherly care which in earlier times held the place now taken by free competition, but privilege, exploitation, the antithesis of Master and Man. The few cases in which the earlier

social arrangements allowed the benevolence of noble rulers or the intelligence of eminent patriots to exhibit themselves produced very beautiful results. We need only think of Colbert, with whose successful activity the protectionist Carey, not without reason, connects himself. We must always bear in mind that we know as yet only the opposition of ruling dynastic interests to free private interests, but not a pure opposition between an egoistic principle and a principle of community. But if we go back to the better times of the mediæval and ancient republics, we see then the sense of community living indeed, but in such narrow circles that a comparison with the present is scarcely possible. And yet even so defective a comparison shows that the profound feeling of discontent which marks the present, is not found in any community where every individual holds his Egoism in check from regard to the general interests.

If we try to submit the justification of the doctrine of the harmony of interests to a direct test, we must, in order to simplify the problem, first suppose a republic of individuals of equal capacities and working under the same conditions, all endeavouring with all their might to produce as much wealth as possible. It is obvious that with one part of their might they will hinder each other, while with the other part they will produce wealth for the benefit of the whole. To abolish this mutual hindrance is only conceivable in two ways: either if all acquire only for the whole, or if each single individual has his own separate sphere of acquisition without any competition. As soon as it can occur that two or more individuals strive to secure the same object, or to utilise it for purposes of production, hindrance will arise. If you apply this abstraction to human relations we see the germ of two ideas: that of communism and that of private property.

Men, however, are not such simple beings, and it is conceivable that they are quite incapable of completely

carrying out either idea. In a state of community of goods the purely egoistic tendency will be directed to the appropriation of a portion of the goods; in a pure system of private property, on the other hand, to the increasing of one's own possessions by over-reaching others. We assume, further, that in our republic there are some goods held in common as well as goods in private ownership, and that there are certain limits to appropriation and over-reaching which are generally recognised; but in such a way that there are always legitimate means by which the individual can gain an advantage in the enjoyment of the common possessions, as well as increase his private property. The most important of these legitimate means is to consist in this, that he who renders greater services to the community receives too a greater reward.

Now we have the idea of the harmony of interests; it is, that is to say, doubtless conceivable that our beings are so constituted that they develop a maximum of force when they think most exclusively of themselves; and, further, that the laws of our republic are such that no one can secure a great advantage for himself unless he produces a great deal of labour for the community. It might too very well be that the gain of force in consequence of the emancipation of Egoism would be greater than the loss arising out of reciprocal interference, and if this were so then the harmony of interests would be established. Yet it is partly difficult to determine how far these presuppositions are fulfilled in human society, and partly we can easily perceive circumstances which at once upset our calculation. Thus, *e.g.*, the means secured by useful labour are at the same time a source of fresh advantages, which are gained by the fact that the possessor makes others work for him. Although now this again involves a gain to the community, yet it is at the same time the germ of a disease which we shall describe further on. Here we wish to exhibit the one aspect of the matter, that he who is once superior to his fellows can also employ

his resources to humour his pleonexia with impunity. The more he advances, the more power he obtains to advance yet further, and not only the resistance of his competitors, but the resistance too of the laws becomes continually weaker. The explanation of this phenomenon lies not only in the law of the increment of capital, but also in an as yet little regarded factor of individual and social development. That is to say, the intellectual power of most men is sufficient to perform much greater tasks than those which, in the present condition of society, must devolve upon them. This observation will be found more fully expounded and established in the second chapter of my book on the 'Arbeiterfrage.' Here let it suffice to point out that most men are perfectly capable, as soon as a favourable start has raised them above the necessity of gaining the necessaries of life by physical labour, of making the labour of many others tributary to themselves by speculation, by inventions, or even by the mere regular and steady direction of a business. The fallacy of the harmony of interests is therefore, too, always connected with the special prominence of a principle which is an almost universal prejudice, the principle that in human life every talent and every faculty finally, though it may be through many obstacles, makes its way to a corresponding position. The exaggerated rationalistic teleology of the last century did a great deal to spread this principle. It is so cryingly opposed to experience that the blindness with which it is maintained could hardly be intelligible,[7] were it not that the self-love of the fortunate, the cultivated, the highly placed, finds as high an enjoyment in the idea of this earthly predestination as ecclesiastical arrogance finds in that of heavenly predestination. In life we see how a specially rapid and brilliant rise from poor circumstances, as a rule, only occurs where the favouring circumstances

[7] See this more clearly shown in the chapter on Happiness in my Arbeiterfrage (Labourer-Question).

coincide with rare and exceptional qualities, but how upon the whole the capacity for filling a leading position is always found where the material conditions of such a position exist. As the germs of plants float in the air, and, each after its kind, spring up where they find the conditions of their development, so is it also with the capability of men to utilise favourable circumstances in order to procure much greater advantages. But this principle, together with the law of the increment of capital, upsets the whole theory of the harmony of interests. We may show a hundred times that with the success of speculation and great capitalists the position of everybody else, step by step, improves; but so long as it is true that with every step of this improvement the *difference* in the position of individuals and in the means for further advancement also grows, so long will each step of this movement lead towards a turning-point where the wealth and power of individuals break down all the barriers of law and morals, where the state sinks to a mere unsubstantial form, and a degraded proletariat serves as a football to the passions of the few, until at last everything ends in a social earthquake which swallows up the artificial edifice of one-sided and selfish interests. The times that have preceded this collapse have so often occurred in history, and always with the same character, that we cannot any longer deceive ourselves as to their nature. The state becomes venal. "The hopelessly poor will just as easily hate the law as the over-rich despise it." Sparta perished when the whole land of the country belonged to a hundred families; Rome, when a proletariat of millions stood opposed to a few thousands of proprietors, whose resources were so enormous that Crassus considered no one rich who could not maintain an army at his own expense. "In mediæval Italy also popular freedom was lost through a moneyed oligarchy and a proletariat." "It is characteristic that in Florence the richest banker finally became unlimited despot, and

that contemporaneously in Genoa the Bank of St. George in a measure absorbed the state." [8]

So long, therefore, as the interests of man are merely individual, so long as the advancement of general interests is regarded merely as the result of the efforts of individuals to advance themselves, it must always be feared that the interests of those individuals who attain the first advantage will gradually become preponderant beyond measure and crush everything else. The social equilibrium of such a state is, as it were, labile; once disturbed, it must ever become more and more disordered. On the other hand, it may be assumed that in a republic in which each individual should have the interests of the community chiefly before him, a state of stable equilibrium might continue. If this requirement is at present nowhere fulfilled, this is equally true of the requirement of universal Egoism. Both are abstractions; in reality, of course, Egoism is much more powerful than the sense of community, if we consider the mass of individual acts which proceed principally from one or other of these principles; which of the two, however, is for a given time historically more important and more full of consequences, is quite another question. However much the enormous development of material interests seems to form the prevailing character of our time; decidedly as the theory of this development has thrust the principle of Egoism into the foreground of the general consciousness, yet, at the same time too, the need for national unity, for societary co-operation, for the fraternisation of hitherto separated elements, has also increased; and which factor of the seething present is chiefly destined to give its character to the future, we can only conjecture. For the present we maintain that if Egoism should for a time maintain the upper hand, we

[8] Roscher, Political Economy, sec. 204, with the notes. Nowadays it is particularly the influence of the great railway companies which makes itself felt in Switzerland, and still more in the United States, to the prejudice of sound republican government.

should not acquire a new principle to give shape to the world, but merely a decomposition that will go still further. As the theory of the harmony of interests is false, as the principle of Egoism destroys the social equilibrium, and with it the basis of all morality, it can even for political economy possess only a passing importance, the time for which is perhaps even now gone by. The superficiality with which the theory of the harmony of interests is ordinarily preached, may for a time be concealed by the disharmony of these interests themselves, by the secret pleonexia of the favoured classes, as the weaknesses of ecclesiastical dogmas are concealed by the endowment of benefices and convents; but it cannot last. How blindly for the most part political economy sweeps together its arguments for the economical theory of interests, may appear from a single example.

Let us consider a European capital, whose millions awake every morning with the most various wants. Even while the majority still lie in profoundest slumber, all are being zealously provided for. Here rolls a heavy waggon, laden with vegetables, through the suburbs; there fat cattle are driven to the slaughter-house; the baker stands before the glowing oven, and the milkman drives his cart from house to house. Here a horse is being harnessed to a cab to carry unknown persons from place to place; there a tradesman is opening his shop, while he counts already the day's takings, without knowing that he can rely upon a single customer. Gradually the streets wake to life and the bustle of the day begins. What governs this immense activity? 'Interest!' Who takes care that every need is satisfied, that all the hungry and thirsty get in good time their bread, their meat, their milk, their vegetables, their spices, their wine and beer, and all that each one needs and can pay for? 'Only business, interest!' What steward, what chief manager of a warehouse could satisfy these million-fold necessities with such regularity on a predetermined plan? 'Impossible idea!'

By considerations like these it is frequently sought to prove how necessary it is to leave the task of providing for the good of men to the economy of interests. In this at least the following points are overlooked:—

1. The whole consideration is an abstraction, which exhibits only one aspect of the reality. All legitimate wants are by no means satisfied, and, so far as they are satisfied, this is effected in innumerable instances not by the mere maxim of self-interest, but with the aid of sympathy, friendship, gratitude, goodwill, and other motives opposed to Egoism.

2. The whole mechanism of providing for our necessities is the result of infinite cares and sacrifices which disappear when considered from without, but in which the history of generations is concealed. Very many arrangements which now are worked by interest originally sprang from humanity, from desire of knowledge, from sympathy, without these human qualities would never have come into existence, and would pass away in time, unless the same qualities could modify them to suit fresh circumstances, or replace them by other means.

3. The ground of historical experience is just as much favourable to any other principle as to Egoism. Every system, no matter whether it be individualistic or communistic, becomes a utopia if it does not connect itself with the existing state of things; and the assertion of one or the other principle means, in practice, only the direction in which further development is to follow. The question is, not whether the influence of interests in the existing system of providing for our wants is great or small, but whether it is wholesome and opportune to make it comparatively greater or smaller.

In this last point especially culminates the whole import of the question, whether Egoism can be the moral principle of the future. That it will in fact play a great part again, as it has done already, is certain. But, after our exposition, it may be considered as also certain that a

further development of individualism would mean not a new impetus, but only the decay of our civilisation. So far as a positive progress is seen in history, we always see the opposite principle in increased activity, while increasing individualism only conduces to the decomposition of forms that have become useless. And therefore for our own time also the true current of progress will lie in the direction of the feeling of community. There is, in fact, a natural—we might almost call it a physical—basis for the gradual supplanting of Egoism by joy in the harmony and order of the phenomenal world, and especially by the common interests of mankind. What Adam Smith meant by 'Sympathy,' Feuerbach by his doctrine of 'Love,' Comte by the principle of 'Altruism,'—these are all merely particular manifestations of the preponderance, arising as civilisation advances, of the objective ideas which form part of our nature over the image of an Ego endowed with pain and pleasure. Just as with the settled ordering of our course of life, the alternation of pleasure and pain loses its vivacity, and the desires are subdued; as, on the other hand, our knowledge of the external world and our understanding of others increases, so this preponderance must come about, and must exercise its natural effects. Even a writer so strongly inclined to scepticism as J. S. Mill makes this conception, coming very near to Comte, the basis of his ethical system, and only overlooks in his 'Utilitarianism' the ideal, formal element which underlies this effort after harmony in the moral world, as much as it does the aspirations of art. And, in fact, we have seen this progress from savagery to human morality already take place so often, and amidst the most various circumstances with such essential uniformity, that the mere inductive inference to the natural necessity of the whole phenomenon is not without value; but when we have discovered in our own sensibility the explanation of this process, we can no longer doubt the existence of the motive principle, though we may indeed

doubt, of course, whether, at any given time and amongst a given people or group of nations, it is stronger than other also very powerful forces, which either in themselves or through their peculiar combination might give an altogether opposite result.

That the progress of mankind is not continuous, every page of history teaches us; nay, it is still possible to doubt whether there exists upon the whole such a progress as we see unfold itself at some particular point and then again disappear. Although to me it seems unmistakable in our present epoch that, besides the rising and falling of civilisation which we see so clearly in history, there is at the same time a continuous advance, the effects of which are only veiled by this fluctuation, yet this idea is not so certain as is that of progress at a particular point; and we find able thinkers, versed in nature and history, like Volger, who deny this progress. But even supposing that it was absolutely certain in the section of history which we are contemplating, yet this could only be a larger wave, as it were the flood-wave, which always rises while the hills and valleys of the breakers roll themselves away, but which at last also reaches its maximum and always falls back with the same play of restless surge. We cannot therefore aid ourselves here by an article of faith or a generally accepted truth, and we must examine more closely the causes which may bring about the relapse of civilisation from public spirit to Egoism.

We find, in fact, that the most important causes for the decline of the old seats of civilisation have long been known to historians. The most simply operating cause is that civilisation is, for the most part, confined to narrow circles, which after a time have their isolation broken in upon, and are swallowed up by wider circles standing on a lower level. Here we always find, too, that the superior portion of human society, whether it be an individual state or a privileged class, only partially controls Egoism within its narrow circle, while externally the opposition is

accentuated, as between Hellenes and barbarians, masters and slaves. The community in whose favour individualism disappears shuts itself off from the outside with all the indications of Egoism, and so invites its own destruction by the imperfect carrying out of the very principles to which, within its own limits, it owes its higher moral culture. A second cause has been already referred to, namely, that within the society which, as a whole, is in a state of progress there are formed distinctions, which gradually become greater, while the points of contact disappear, mutual relations decrease, and thus the chief source of binding sympathy is lost. Privileged classes are thus developed within the originally homogeneous body; but even these attain no proper coherence; and as the accumulation of wealth leads to hitherto unknown luxuries, there arises a new and refined Egoism which is worse than the former. So it was in ancient Rome in the age of *latifundia*, when agriculture was supplanted by the pleasure-grounds of the rich, and half-provinces belonged to single individuals.

This state of things is originally intended by nobody, not even by the stronger and richer classes, so long as the differences are moderate. It arises under the influence of *law*, which originally has the opposite object of maintaining equality and equity, and, on the principle of private property, of securing to every one his own. It arises, moreover, under the unhampered development of social relations, which can only come about with the restraining of brutal Egoism. Even without elevating Egoism into a principle, in all times order has been first brought into society by the institution of property and its regular devolution, so far as it has not rested upon the traditions of force, on the antithesis of master and man, which we here leave out of account. But these very institutions—Property, Law, Inheritance, &c.—which spring from the softening of manners and bring about the prosperity of peoples, at the same time protect the rank evil of in-

equality of wealth, which, after it has reached a certain height, becomes stronger than any counter influence and inevitably brings about the nation's ruin. This process is repeated in the most various forms. A morally feebler nation succumbs to slighter degrees of the evil; a stronger, or we might say a more advantageously constructed nation, may, like modern England, support an uncommon degree of the evil without destruction.

In a quite uncivilised state such an inequality of wealth, as appears amongst nations approaching their fall, cannot possibly occur. When there is booty to be divided, the stronger takes for himself the largest share; the weaker must perhaps suffer the grossest injustice; but his general condition, even though he fall into slavery, cannot easily be so different from that of the powerful, as is the condition of the poor from that of the rich in the increasing development of industrialism.

This inequality, we repeat, is not originally intended; otherwise the people must, in their earliest youth, have consciously favoured dogmatic Egoism. But their feeling was then very different. 'Privatus illis census erat brevis, Commune magnum,' says Horace of the ancient Romans; and seldom has the contrast between epochs of lively public feeling and of extravagant self-seeking been so sharp and truly exhibited as by this poet. And yet it was those ancient Romans who created the foundations of those legal codes which Europe still admires and employs. If, therefore, the protection of law and the consecration of property allow tares to grow up together with the wheat, there must be circumstances which produce this result against the will of legislators,—circumstances which either were originally not contemplated, or which perhaps cannot be at all avoided. If we reflect that a lawful and orderly state of things can indeed only arise through the awakening of sympathy and public spirit and the slackening of the cruder egoistic impulses, but that Egoism in such a community, as was, for example, ancient Rome, still plays

a very considerable part, and is only, as it were, reduced to certain limits, within which it is recognised as legitimate, then we are led to ask why, in like manner, were not limits set up to the excessive inequality of wealth, in order to maintain the healthy equilibrium between Egoism and public spirit? We find, then, that precisely in ancient Rome the noblest and best of her citizens vainly attempted the solution of this problem. It is, moreover, quite natural that those amongst the propertied class who are not exactly distinguished for their perspicuity or their unselfishness—without, for all that, being dogmatic egoists—are inclined to see in all attempts at such a limitation of acquisition merely an attack upon property, and that the shaking of the foundations of society appears to them in an exaggerated light, because their interests are too closely connected with the existing state of things. If it had been possible to exhibit to the Roman optimates of the age of the agrarian struggles the history of the succeeding centuries as in a mirror, and to demonstrate to them the causal connexion between decline and the accumulation of riches, perhaps Tiberius and Caius Gracchus would not have had to pay for their higher insight with their blood and good fame.

It is not quite superfluous to point out that it would be a mere petitio principii to maintain the limitation of acquisition to be wrong. The very point at issue is what is right. The primitive right—a right which all nature recognises—is the right of the stronger, the right of might. Only after a higher right has been recognised, does this become unright; but only then so long as the higher right actually renders higher services to society. If the constitutive principle of right becomes lost, then the right of the stronger always revives, and in a purely moral aspect one form of it is not better than another. Whether I wring my fellow-man's neck because I am the stronger, or whether by my superior knowledge of business and law I lay a trap for him and cause him to groan in misery, while I 'lawfully' appropriate the profit of his labour,

makes very little difference. The very misuse of the mere might of capital on the one side against hunger on the other is a new right of force, even though it be only directed to make the man who has nothing ever more dependent. What legislation has not originally foreseen is the possibility of making such a use of the command of capital and knowledge of law as, in its disastrous effects, surpasses even the old right of force. This possibility lies partly in the capacity already mentioned of every propertied person for the exploitation of hired labour, but partly in certain relations between the law of population and the accumulation of capital, which were discovered by the political economy of last century, but which even yet, despite the great services which Mill, in particular, has rendered in the elucidation of this point, are not completely understood in their nature and operation. In my work, 'Mill's Ansichten über die Sociale Frage und die angebliche Umwälzung der Social-Wissenschaft durch Carey,' I have endeavoured to do something for the critical solution of these questions, and I will here confine myself to the application of the results, so far as they can serve our purpose.[9]

In the last century several leading men, amongst them Benjamin Franklin, took up the observation that the natural increase of mankind, like that of animals and plants, if it were unhindered, must very soon more than fill the earth.[10] This incontrovertible and obvious but, until then, unregarded truth must, at that time, have forced itself upon any observing mind, that compared the rapid growth of population in North America with the

[9] The main question here is to show that a *rent* accrues to the presence of an object from the labour of others, the most important species of which is *ground-rent*. The conception of ground-rent as a 'priority-rent' is further developed and more clearly established in the two later editions of my Arbeiterfrage, cap. 6; 3 Aufl. S. 297–322.

[10] Franklin, Observations Concerning the Increase of Mankind, 1757, Comp. Mohl, Gesch. u. Lit. d. Staatswissensch. iii. 476. On other forerunners of Malthus, ib.; besides Roscher, Volkswirthsch. § 242, A. 15; and Marx, Das Kapital, 1te Aufl. S. 603, A. 76.

condition of European countries. It was found that the increase of population depends not upon the fertility of marriages, but upon the quantity of food produced. This simple conception, which Malthus rendered famous, but also provided with erroneous additions, which we here leave out of view, has since, by the perfection of statistics, been shown to be indubitable.

Almost simultaneously there appeared another doctrine, erroneous indeed in its original form, the doctrine of Rent. It was supposed that the owners of the soil derive from its inexhaustible forces, besides the interest of their capital and the reward of their labour, yet another profit, which results from the monopoly of the use of these natural forces. Later, it was shown that this is only so far true as the quantity of ground is limited, or in consequence of certain circumstances—dread of emigration, lack of capital for the working of fertile bottom-lands, want of liberty, &c.—which must be regarded as limited. Thus there occurs in a relative sense the same state of things that must exist absolutely, if the whole cultivable surface of the earth had become private property. Although, therefore, the doctrine of rent has only a relative validity, yet for each country there is a certain point at which it becomes to a certain degree applicable.

Finally, it has been found that the amount of the wages which is paid by an employer provided with capital to those who, having no land or other property, must maintain themselves solely by their labour, is, like all other prices, determined by supply and demand. In so far, therefore, as the supply exceeds the demand, the wages of labour must sink to a minimum. It is very natural that just here the theory of Egoism should approximate very closely to reality, as we have to deal with a succession of small differences; and the employer who regards his own interests from the standpoint of existing legal rights, has himself, to begin with, only a vague idea of the results of this relation.

In less civilised times the population is continually being decimated partly by unfavourable climate, together with want of food, partly by feuds and wars, with the barbarous treatment of the conquered; the accumulation of capital cannot go on uninterruptedly, and upon superfluity of labour follows want, upon want of soil the possibility of acquiring extensive territories by slight exertion. So soon, however, as the worst passions are subdued, and common feeling and legislation have begun their work, there begins also, like the tares that grow up amidst the corn, the operation of the circumstances just referred to.

The population increases, soil for tillage begins to fail; rent rises, wages fall; the difference between the positions of the proprietors and the tenants, the tenants and the hired labourers, becomes even greater. Now the flourishing state of industry offers the labourer higher wages; but soon so many arms come streaming in that here the same process is repeated. The only factor which now checks the growth of the population is poverty, and the only salvation from extreme poverty is the taking of work at any price. The fortunate employer finds immeasurable riches pouring in upon him; the workman receives nothing but his miserable existence. So much happens quite apart from dogmatic Egoism.

Now the misery of the proletariat shocks sympathising hearts; but the way from this state of things back to the old simplicity of morals is impossible. Very gradually the propertied classes have become accustomed to the rich and manifold enjoyment of refined luxuries. Art and science have developed themselves. The slave labour of the proletariat provides many capable minds with leisure and means for researches, inventions, and creations. It seems a duty to preserve these higher possessions of humanity, and men easily console themselves with the thought, that some day they may become the common property of all; meanwhile the rapid growth of wealth admits many to these enjoyments,

whose mind within is all uncultured. Others degenerate morally, no longer retaining any care, or any sympathy for anything that lies beyond the circle of their pleasures. The more active forms of sympathy with suffering disappear simply through the monotonous enjoyment of the more fortunate. These begin to regard themselves as peculiar beings. Their servants are as mere machines to them; the unhappy are regarded as inevitable accessories; they have no longer any feeling for their fate. With the tearing away of moral bonds dies out the shame which before held them back from too unrestrained enjoyments. Their intellectual form is choked by luxurious living; the proletariat alone remains rude, oppressed, but fresh in mind.

In such a condition was the ancient world when Christianity and the migration of the peoples put an end to its magnificence. It had become ripe for its destruction.

CHAPTER II.

CHRISTIANITY AND ENLIGHTENMENT.

THE present state of things has been frequently compared with that of the ancient world before its dissolution, and it cannot be denied that significant analogies present themselves. We have the immoderate growth of riches, we have the proletariat, we have the decay of morals and religion; the present forms of government all have their existence threatened, and the belief in a coming general and mighty revolution is widely spread and deeply rooted. At the same time, however, our age possesses powerful remedies; and unless the storms of the crisis of transition surpass all our ideas, it is not probable that humanity must begin once more its intellectual efforts from the beginning, as in the times of the Merovingians. And one of the most important remedies lies, beyond doubt, in those very ideas of Christianity, whose moral effects are just as often undervalued as they are exaggerated.

It is true that civil society very early concluded its separate peace with the principles of the New Testament. It was with business and social intercourse as with high politics and even with the Church. "All Christians," says Mill in his admirable book 'On Liberty,' "believe that the blessed are the poor and humble, and those who are ill-used by the world; that it is easier for a camel to pass through the eye of a needle than for a rich man to enter the kingdom of heaven; that they should judge not, lest they be judged; that they should swear not at all;

. . . that they should take no thought for the morrow; that, if they would be perfect, they should sell all that they have and give it to the poor. They are not insincere when they say that they believe these things. They do believe them, as people believe what they have always heard lauded and never discussed. But in the sense of that living belief which regulates conduct, they believe these doctrines just up to the point to which it is usual to act upon them. . . . The doctrines have no hold on ordinary believers — are not a power in their minds. They have an habitual respect for the sound of them, but no feeling which spreads from the words to the things signified, and forces the mind to take them in, and make them conform to the formula."

And yet it could not happen without leaving some traces upon mankind that, through centuries, just *these* formulas were repeated, *these* sayings recognised, *these* ideas again and again recalled. In all ages there have been many more impressionable souls; and it is hardly an accident that it is just the Christian countries in which at length—even though it was after eighteen hundred years, even though it was only when the decay of ecclesiastical forms and dogmas had begun—that a regular system of poor-relief began, and in which the idea was developed that the misery of the masses is a disgrace to humanity, and that everything must be done to get rid of it for good. We must not allow ourselves to be misled by the fact that in the palmy days of ecclesiastical domination poverty was, as it were, artificially encouraged in order to provide for ceremonial almsgiving; that the peoples have sighed so heavily under no yoke as under that of the priests; we must not be dazzled by the remark that the professedly pious only too easily make terms with morality, and that it is often the freethinkers, nay even the enemies of the existing churches, who have devoted all their thoughts and deeds to oppressed humanity, while the servants of the Church sit at the tables of the

rich and preach subjection to the poor. If we admit that the morality of the New Testament has exercised a profound effect upon the peoples of the Christian world, it is by no means therefore to be assumed that this effect must be chiefly seen amongst the persons who, in our own days, most occupy themselves with repeating the words of the doctrines. We have seen, with Mill, how slight the immediate effect of these words upon the individual usually is; and especially upon those very persons who have been familiar with these sounds from their youth up, and have been wont to connect certain solemn feelings with them, without ever reflecting upon their full meaning, or feeling a breath of the force which originally dwelt in them. We will not here institute a psychological inquiry, whether it is perhaps more probable that traditional ideas exert a greater effect where their mere continuance is interrupted by doubt, by partial opposition, by the appearance of new and strange trains of thought; all we want to establish is that just because these words everywhere resound throughout the Christian world and are transmitted from generation to generation, their real meaning and their kindling power may at least as well take hold of a mind that presents a new soil to them, in which they may germinate, as of a mind that is wholly given up to the old associations of ideas. On the whole, therefore, it is very probable that the energetic, even revolutionary, efforts of this century to transform the form of society in favour of the downtrodden masses, are very intimately connected with the New Testament ideas, although the champions of these efforts feel themselves bound in other respects to oppose what is nowadays called Christianity. History affords us a voucher for this connexion in the fusion of religious and communistic ideas in the extreme left of the reformation movement of the sixteenth century. Unfortunately the purer forms of these efforts are still not sufficiently enough appreciated, and the isolated cari-

catures which have been handed down to us in crude colours, are torn away from their background of a powerful and wide-spread idea. Even highly cultured men of the Catholic party could not then remain inaccessible to these ideas. Sir Thomas More wrote his 'Utopia,' a work of communistic tendency, not merely as a jest, but with the intention of influencing his contemporaries, even though only by a picture of, literally speaking, an impossible state of things. The 'Utopia' was, with him, a means of spreading thoughts which one could hardly dare to present in any other form, and which were, in fact, far in advance of their age. Thus he represented the idea of religious toleration, which in our time has found universal acceptance. His friend and the sharer of his views, L. Vives, protested indeed in a mildly written treatise against the communistic violence of the Peasant War; but he was also one of the first to declare openly that the care of the poor should not be left to casual charity, but that it must be recognised among Christians as a duty to provide adequately and regularly for the poor by definite civil institutions.[11] Not long afterwards it was decided, first of all in England, to establish a system of civil poor-relief; and this very institution, which, since the French Revolution, like civil marriage, civil baptism, and similar institutions, seemed rather to form an antithesis to ecclesiastical institutions, has demonstrably sprung from Christian principles. Such metamorphoses of an idea are not uncommon in the history of civilisation; and without exactly resolving everything with Hegel into its opposite, it must be admitted that the operation of a great thought very frequently assumes an almost diametrically opposite tendency through a fresh combination with other elements of the age. Very striking, too, is the relationship between Comte's moral principles and those of Christianity; a religious impulse is unmistakable in Comte, and most of the phenomena of French

[11] Comp. my article 'Vives' in the Encykl. d. ges. Erzieh.- u. Unterrichtswesens, 9 Bd. 737-814, esp. 761 f.

and English Communism have common features. Most deserving of attention is the venerable Owen, who devoted his riches to the poor, and was denounced by the luxurious and arrogant professors of religion because he denied that existing Christianity could bring relief to the masses in their misery. It is indeed only too natural that in times of overweening egoism, when traditional religion has come to terms with material interests, such natures, seized by a breath of the old spiritual life of religion, break with the existing forms. It is therefore not impossible that amongst the analogies between our time and the decline of the ancient world there may reappear also that creative and combining element which then produced from the ruins of the old order the community of a new faith. Yet here we stumble on the assertion that the power of religion is over, since the natural sciences have destroyed dogma, and the social sciences have shown us how to order the life of the people more satisfactorily than the principles of religion ever could. Well, we have seen that at least the social sciences have not as yet produced any such effect. They succeed indeed in showing us that a powerful and ambitious ecclesiasticism always serves to hamper a people economically, intellectually, and morally; that enlightenment and education, as a rule, go hand in hand with a decrease of the clergy in relative numbers and influence; that the diminution of crime corresponds with the diminution of superstition, which is inseparably connected with the worship of the letter. We know that belief and unbelief make no discoverable difference in the conduct of men upon the whole, and so far as it is externally observable in obvious actions. The believer, like the unbeliever, behaves morally or immorally, and even criminally, from causes, the connexion of which with his principles is only seldom apparent, and even then appears to be rather an incidental effect of the association of ideas. It is merely the mode and manner of the psychical process that are different; the one man succumbs to a temptation

of Satan, or follows, while retaining his senses otherwise, a supposed higher inspiration; the other sins with cold frivolity or in the intoxication of passion. We are very unjustly accustomed to dispose of pious criminals by simply regarding them as hypocrites; the cases in which religion is assumed merely as a cloak are nowadays rare; while, on the other hand, the most disgraceful acts are very frequently combined with really deep religious emotions; of course emotions just as subject to the weaknesses which we have characterised above in the words of Mill, as those of the irreproachable pious. It may, too, be true that continual occupation with religious feelings often leads to moral enervation; but this is assuredly not always the case, and belief seems often to act wonderfully in hardening the strength of character. How otherwise could we explain the figures of Luther or Cromwell? Scientifically speaking, nothing is ascertained as to the moral effects of belief and unbelief in themselves; for the greater moral barbarism of districts which are enslaved to belief in the letter may be an indirect result, which proves nothing as to the main point. It is just in such districts that emancipation from religion is most often found united with moral degeneracy, while in more enlightened districts the most abandoned are rather the believers. Statistics show us indeed that, *cæteris paribus*, in Germany Protestant districts exhibit more fraud, Catholic districts more violence. But all these facts allow of no inferences as to internal morality; for the more numerous cases of fraud, rightly regarded, arise from the larger amount of business, and the acts of violence spring not from belief in the Immaculate Conception, but from a want of education, which is primarily connected with the external presence of the ecclesiastical régime and the poverty which is its result. How difficult it is altogether to draw conclusions from moral statistics we have already seen, and we refrain therefore here from a special criticism of some interesting points, since the final result in reference to the question

immediately before is, at all events, only negative. So much is certain, that the parsons' doctrine of the moral depravity of all infidels is not confirmed by experience, and that just as little can moral injury be shown to result from belief. But if we survey the whole course of history, it seems to me to be scarcely doubtful that we may in great part attribute to the quiet but continual operation of Christian ideas, not merely our moral, but even our intellectual progress; and yet that these ideas can only develop their full activity by bursting asunder the ecclesiastical and dogmatic form in which they have been enclosed, as the seed of a tree in its hard shell.

The wrong side of this beneficial influence of Christianity is to be sought just in those doctrines and institutions, through which a permanent and unconditional dominion of dogmas and of the Church was to establish itself over men's hearts. Above all, it is the doctrine which early forced its way into the circle of Christian dogmas, of the universal damnation of all mankind and of the eternal tortures of hell, which, by the depressing of men's minds and the raising of priestly arrogance, has brought unutterable evils upon modern nations. The right of the Church to bind and to loose became the corner-stone of the hierarchy, and the hierarchy in all its forms and gradations became the curse of modern nations. But even when it was apparently broken up, the love of power remained the most prominent characteristic of the clergy as a special class, and with only too much success the plentiful resources of religious ideas and ecclesiastical traditions were employed to produce an enslavement of the mind, that must end in insensibility to any immediate action of great ideas. Thus historical Christianity produced an enormous gulf between the small flock of elect and really free minds and of the debased and down-trodden masses. It is the same phenomenon in the spiritual sphere which Industrialism has produced in the material sphere, and here,

as there, this break in the national life is the great mother-evil of our days.

The ethical characteristics of a religion consist not so much in its moral doctrines themselves as in the form in which it seeks to establish them. The ethics of Materialism remain indifferent with regard to the form in which its doctrines establish themselves; they hold to the matter, to the content of the individual element, not to the way in which the doctrines shape themselves into a whole of a definite ethical character. This is most conspicuous in the Interest-morality, which, when most favourably regarded, is a casuistic system that teaches us to set permanent interests above fleeting ones, and great interests above small ones. The often-attempted deduction of all the virtues from self-love remains, therefore, not merely sophistical, but also cold and tedious. But the morality, also, which results from the principles of natural altruism not only harmonises, as we have already shown, very well with physical Materialism, but it even bears itself a Materialistic character, so long as the ideal is wanting according to which man endeavours to order his relations to his fellow-men, and generally to establish harmony in his phenomenal world. So long as morality merely insists that we should yield to feelings of sympathy, and counsels us to care and to work for our fellow-men, so long it still bears an essentially Materialistic character, however much it may counsel self-sacrifice instead of enjoyment; only when a principle is set up as the central point of all our efforts do we get a formalistic tendency. Thus in Kant, whose ethics materially very nearly coincide with those of Comte and Mill, but, nevertheless, are very sharply distinguished from any other utilitarian doctrine by the fact that the moral law, with its serious and inexorable reference to the harmony of the whole of which we are parts, is regarded as given *a priori*. As to the truth of this doctrine, it will be in much the same case as the truth of the doctrine of the Categories. The

deduction of the principle is incomplete, the principle itself capable of improvement; but the germ of this consideration for the whole must be given in our organisation prior to all experience, because otherwise the beginning of ethical experience would be altogether inconceivable. The principle of ethics is *a priori* not indeed as a ready-made, developed conscience, but as an arrangement in our original disposition, the nature and operation of which, like the nature of our body, we can only gradually and *a posteriori* learn partially to know. This knowledge, however, is by no means hindered by the fact that a definite principle is expressed, which only contains one aspect of the truth. It must here, at least theoretically, be admitted, as is admitted in physical inquiry, that the idea is just as important for progress as experience. But in so far now as we are concerned not to *know* the most correct moral philosophy, but to be *moved* to good and noble actions, the idea, which even in the sphere of knowledge appeared as the real spring amidst the wheelwork of experience, attains a heightened significance. But of course the question may be renewed here, whether the guiding idea does not often guide us astray? and especially with regard to religious systems it may be asked, whether it is not better simply to resign myself to the ennobling influence of natural sympathy, and so slowly, but surely, to advance, than to listen to prophet-voices, which already but too often have led to the most hideous fanaticism?

Originally religions are by no means intended to serve the purpose of morality. The offspring of the fear of violent natural phenomena, of fantasy, and barbaric inclinations and conceptions, the religions amongst uncivilised people are a source of horrors and crudities, which could hardly arise from the mere conflict of interests even in its crudest form. How much of such disfiguring elements still adheres to religion, even amongst civilised peoples, may appear from the judgment of

Epikuros and Lucretius, since we, dazzled by the sublime aspects of the ancient mythology, find it difficult to think ourselves into the religious system of the ancients. And yet the mere belief in supersensuous, powerfully ruling beings, must of itself afford an important starting-point for the natural development of ethical ideas. The antithesis of the whole of human society as opposed to the individual is not easy for the savage to apprehend, but thought of an avenging being *outside* humanity might very well act as an early substitute for this; and, in fact, we find the Deity as an avenger of human misdeeds even amongst people whose ideas are still very crude, and whose religious observances are in part abominable. With the advance of civilisation the ideas of the gods advance also, and we see how deities who originally only personified a terrible or beneficent natural force gradually receive a more decided ethical significance. Thus in the classical period of ancient Hellas we can discover at once the traces of the old natural import of the gods by the side of their ethical import, and side by side with both was the degeneracy of the cruel popular superstition which played a much greater part in the religious practices of daily life than we should be led to suppose by the magnificent traditions of Hellenic poesy and sculpture. Thus can religion simultaneously conduce to ethical progress and sanctify horrors, while in correspondence with a people's character it develops in peculiar forms the varied creations of an ideal world.

In the creations of human thought is repeated the primeval problem of the relation of the whole to its parts. Materialism will never be able to refrain from analysing even the spiritual creations of religion into their elements, as it resolves the corporeal world into atoms. Fantasy, fear, and fallacy in its view make up religion, which is a product of these separate influences, and if it assigns to it an ethical influence, it will explain this as a transference of natural morality to supernatural ideas. When we see

how often religion exerts an astonishing power over mankind for good or evil, how in medieval times it drives thousands of children to a crusade, and in our own days makes the Mormons flee amidst battle and privations to the wilderness of the Salt Lake; how Mohammedanism, with the swiftness of a blazing flame, remoulds nations and agitates whole continents; how the Reformation founds an epoch in history; this is all in its view but a specially efficient combination of these factors of sensibility, passionateness, and error, or imperfect knowledge. We, on the contrary, shall remember that, as in external things, so too here the value and the essence of the object does not lie in the bare fact that these and those factors co-operate, but in the *form* which this co-operation takes, and that this form—for us, practically considered, the most important point—is only recognisable in the peculiar *whole*, and not in the abstracted factors. What led Aristotle to give precedency to Form over Matter and to the Whole over its Parts was his profoundly practical nature, his ethical sense; and though in exact science we must always oppose him, and ever and ever again must explain the whole by the parts, the form, so far as we can, by the matter, yet we know very well since Kant that the whole necessity of this procedure is only a reflex of the organisation of our analytically inclined understanding, that this process is a *processus in infinitum*, which never completely reaches its goal, though, on the other hand, it must never shrink back from any problem presented to it. We know that there always exists the same great contradiction between the complete and peculiar nature of a whole and the approximate explanation of it from its parts. We know that in this contradiction is reflected the nature of our organisation, which only gives us things whole, complete, and rounded in the way of poesy; partially, approximately, but with relative accuracy in the way of knowledge. All great misconceptions, all historically important errors, spring indeed from the confusion of

these two modes of conception: either we bring the results of poesy, the commandments of an inner voice, the revelations of a religion as absolute truths into conflict with the truths of knowledge, or we allow them no place at all in the consciousness of the people. True, indeed, all the results of poesy and revelation purport to our consciousness to be absolute, immediate, since the conditions from which these products of conception proceed do not come with consciousness; it is also true, on the other hand, that all poesy and revelation are simply false, so soon as we test their material contents by the standard of exact knowledge; but this Absolute has a value only as an image, as a symbol of that other Absolute, which we cannot know at all, and these errors or intentional deviations from reality only do harm when they are treated as material knowledge. Religion has, therefore, in times which united a certain degree of culture and piety always been inseparable from *art*, while it is a sign of decline or of stagnation when its doctrines are confounded with sober *knowledge*. There the true value of ideas lies in the form, as it were in the style of the architecture of our ideas, and in the impression of this architecture of ideas on the soul; here, on the contrary, all ideas should, as well individually as in their connexion, be materially correct.

But religion must at any price contain truth! It must originate, if not from human knowledge, yet from a higher insight, a science of the essence of things, which is revealed to men by the Deity. We have already sufficiently declared that we cannot in any way admit either a co-ordination or a subordination of religious knowledge as compared with the results of methodical science, and we are disposed to assume that this principle, together with the classification of religion with art and metaphysic, will at no very distant time be generally conceded; nay, it appears to us as though this circumstance is even by the most decided believers recognised, or at least suspected, very much

more widely than is commonly supposed. The great mass of the professors of all religions may indeed still be in a state of mind like that in which children listen to fairy-tales. The full masculine sense for reality and verifiable accuracy is simply yet undeveloped. Only with its appearance does the credibility of those stories disappear, because another standard of verity is applied; but the sense for poesy remains true to the genuine man through all the stages of life.

The ancients regarded the poet as an inspired seer, who, full of his subject, was quite carried away, and in spirit raised above vulgar reality. Should not the same possession by an idea have its justification in religion too? And if then there are souls which are so sunk in these emotions that, as compared with them, the vulgar reality of things sinks into the background, how otherwise shall we characterise the vividness, the persistency, the activity of their spiritual experiences than by the word "truth"? Of course the word here has then but a figurative sense, but the sense of a figure which is more highly prized by men than the reality, which receives its whole worth only from the light which the rays of this figure shed upon it. In the case of the nominal Christian, you can by the aid of logic clear from his mind the notions which his memory may have retained from the age when he learnt his catechism, but you cannot argue away to the believer the value of his inner life. And even though you prove to him a hundred times that it is all but subjective sensations, he lets you go your way with subject and object, and mocks your simple efforts to overturn by the breath of a mortal man the walls of Sion, whose towering battlements he sees lighted by the radiance of the Lamb and the everlasting glory of God. The masses, poor in logic as in faith, hold the might of prophetic conviction as just as much a criterion of truth as the proof of a sum; and as language is the possession of the people, we must, therefore, in the meantime, admit the double use of the word "truth."

But talk not to me here of "bookkeeping by double entry!" This idea, doubly objectionable, has in the first place a false name, invented by a professor who had probably never seen a mercantile book, and who, at all events, meant something very different from what the *tertium comparationis* expresses; but next it belongs in truth to that twilight world of childish tales that we just now described. It corresponds to the standpoint of people who, as a result of acquired scientific activity, have got so far as to be able to distinguish true and false with method and conscience within their special subject, but who cannot yet carry the genuine criterion of truth into other spheres, and in these, therefore, meanwhile, admit as true what best agrees with their vague feelings. The philosopher may allow the second signification of the word "truth," but can never forget that it is a *figurative* one. He may indeed warn us from a blind zeal against the "truths" of religion, if he is convinced that their ideal content still retains a value for our people, and that this value suffers more by an inconsiderate attack upon forms than is gained on the other hand by enlightenment. He cannot, however, go further, and he can never allow that doctrines which in their nature are variable with the changing character of different times should be imported into any book in which account is kept of the lasting treasures of human knowledge. In the relations of science we have *fragments* of truth, which are continually multiplying, but continually remain fragments; in the ideas of philosophy and religion we have a figure of the truth, which presents it to us as a whole, but still always remains a figure, varying in its form with the standpoint of our apprehension.

But how then does it stand with rational religion? Have not the Rationalists, or Kant, or the Free Congregations of our own day, succeeded in establishing a religion, which teaches pure truth in the strictest sense of the word, which is purified from all the dross of superstition,

or, as Kant says, from the stupidity of superstition, and the delirium of enthusiasm, only satisfies the ethical end of religion?

The answer to this is, if we understand truth in the ordinary, not figurative sense of the word, a very decided No; there is no rational religion without dogmas, which are incapable of proof. If, however, we regard reason, with Kant, as the faculty of ideas, and simply substitute ethical verification for proof, then everything that is ethically verified is equally justified. Kant's minimum of God, Freedom and Immortality, may indeed be dispensed with; the Free Congregations have already thrown it overboard, and the principles which they retain may also be dispensed with.

All these doctrines may in principle be dispensed with, in so far that it cannot be shown from the universal characteristics of man, or from some other reason, that a society without these doctrines must necessarily fall into immorality. But if we take the case of a particular community, *e.g.*, that of the Germans in the present epoch, it is quite possible that the ethically most valuable combination of conceptions demands very many more ideas than Kant was willing to base his rational religion upon. This is, to speak plainly, a matter of taste; only that, of course, it is not the subjective taste of an individual that is the real determinant, but the whole state of culture in a nation, the dominant forms of the association of ideas, and a certain fundamental disposition of mind, which is the result of innumerable factors.

The Rationalists of last century shared in the general tendency of the culture of their age towards intellectual aristocracy. Even though, as a rule, they cared more earnestly for the weal of the people than the orthodox, yet they started from the needs and aspirations of the educated classes. Amongst these an entirely new religion could still be held possible, because they were not yet sufficiently convinced that after the elimination of all

that is doubted by the critical understanding *nothing whatever is left.* From Kant, at all events, they might have learnt this, but he, with his purely ethical basis of religion, was understood by too few, and thus even in this century the idea could return of a religion purified from all error. Uhlich very admirably describes in a pamphlet penetrated by the noblest feeling for the truth—'Antwort auf einen offenen Brief,' 1860—how the transition from Rationalistic ecclesiasticism to complete severance from Protestantism led the founder of the Free Congregations a great step farther. "We had been of opinion that if we only got rid of all in our Church against which reason and conscience in us had long protested, what was left would satisfy us both in doctrine and form, and would be for us the true and beatific religion. But we gradually learned that if to think for one's self in religion is once recognised as a right and exercised as a duty, we must then keenly examine all traditional ideas, even those that never offended us before, to see whether or not they rest on the basis of eternal truth." But what now is this basis of eternal truth upon which the religion of the Free Congregations is supposed to rest? It is no other than science itself, especially the natural sciences. Uhlich calls religion the "science of sciences;" he rejects all dogmas that rest only upon probability or conjecture, as, *e.g.*, the hypothesis of a conscious world-soul; he explains truth as "the reflexion of reality, of the real world with its things and forces, laws and processes, in the soul of man." What lies beyond the limits of scientific inquiry cannot belong either to religion. At the same time, religion, in an ethical regard, is with him "the recognition of the relation of mankind to an eternal order, or, if we prefer it, to a sacred power to which it has to submit itself." The "one thing needful" is the building up of a kingdom of the true, the good, and the beautiful. The basis of the whole doctrine must, therefore, of course, lie in the point of union of the ethical

and intellectual part, in the principle by which strictly scientific knowledge attains to moral influence. But this principle is the unity of the true, the good, and the beautiful. With the attainment of truth, it results from this principle that a fuller and higher humanity is also attained, and conversely, and both united lead to the utmost beauty, to the purest joy and blessedness. Here, then, we have, in the full sense of the word, a *dogma* which not only is not proved, but which, in fact, when logically tested, is *not true*, but which, if held as an *idea*, may, indeed, like any other religious idea, edify mankind and raise him above the limits of sense. Truth, in the sense of reality, not only does not coincide with Beauty, but stands, in fact, in distinct opposition to it. All beauty is poesy, even that which is the immediate object of the senses; for even the most primitive sense-activity, as we have shown in the previous Section, includes a contribution from our mind. The artist *sees* his subject even in immediate observation as more beautiful than the less susceptible layman, and the realists in painting are only distinguished from the idealists by this, that they take up more of the qualities of reality into their work, and allow the pure ground-idea of the object to appear crossed by the ideas of its circumstances; but if they did not idealise at all, they would be no longer artists. The eye of love poetises, the longing of the heart poetises; melancholy remembrance and joyful meeting, all passions and activities of the senses poetise; and if we could entirely abolish this poesy, it is a question whether anything would be left to make life worth living. So, then, Uhlich's whole view of nature also—an indispensable part of his religion—is nothing more than a poem. "It is my true and real feeling," says Uhlich, "when I bow down and gaze at a flower, that the Deity looks at me from it, and sends towards me a sweet perfume." Very well; but then, too, it is the true and real feeling of the believer when, in prayer, he feels and knows the presence

of his God, that he is heard. We may contest the external source of the feeling, but never the feeling itself. But if, in nature, I linger over the contemplation of the beautiful and comparatively perfect in order to edify myself, then I make nature itself my idea of the good and beautiful. I overlook the withered spot in the calix of the flower and the ravages of the caterpillar on the leaves, and if a flower grows in my garden that smells unpleasantly, I do not use it in order to pray a little to the Devil also, but I tear it up and fling it to another part of nature, which can still less serve me for edifying contemplation.

It depends upon me, whether perfection or imperfection seems to preponderate in nature, whether I carry into it my idea of beauty and then receive it back a thousandfold, or whether I am met everywhere by the traces of corruption, of spoliation, and of the struggle of extermination. And if then I conceive the succession of life and death, of swelling abundance and sudden decline, I find myself at the point of origin of Dionysos-worship, and with a glance at the contrast between the highest ideal and all living things, I feel at once the need for a redeemer.

This suggestion is not, of course, meant to show that edification, in the sense of the Free Congregations, is to be absolutely rejected, but only that, as compared with other forms of edification, it cannot lay claim to the privilege of unconditional truth. It is a question of more or less of truth and poesy, and the fact that this is not recognised by the founders of the Free Congregations places their religious conception intellectually behind Kant and Fichte, while, however, it lends it a character of naïveté which is otherwise only to be found in orthodoxy.

It has indeed been observed from the philosophical side, that in the advance of knowledge we must take as a basis for the religion of the future such a point as would admit of our still really and unaffectedly believing as the Free

Congregations do, and in which the difference between the result of critical thought and religious feeling would completely disappear for us, even though it should arise again for later times. But what else is this than to support religious belief upon a metaphysical belief? If now the latter cannot exist unless through poesy, why should not religion itself exist through poesy without any need for metaphysical mediation? But if speculation can help to bring about that the religious ideas of the future shall not be too much determined by the subjective leanings of a few too powerful characters—which was certainly the case at the period of the Reformation—if it can help to bring it about that these ideas shall be taken right from the centre of all our culture, and not merely be gathered from the surface of ecclesiastical polemics, then their labour will be welcome; only that it will be quite impossible for us to exercise a child-like faith with regard to them.

A champion of the advanced Reform theology, the spiritual and eloquent Pastor Lang, in his 'Versuch einer christlichen Dogmatik,'[12] has combated our stand-

[12] Comp. Lang, Versuch einer christlichen Dogmatik, allen denkenden Christen dargeboten, 2te Aufl. Berl. 1868, S. 3–6. The objection there raised, that from my standpoint it is "quite indifferent" whether the philosopher "as a religious man" kneels before Mary or the personal God, is disposed of by pointing out that we assume a necessary course of development in the ideas of humanity. Not any given poetical idea can serve our purpose, but only that which is adapted to our time and to the character of our culture. That Lang comes back also to the 'bookkeeping by double entry,' is only explained by the onesidedness with which he tries to conceive everything, even against the most express declarations, from the standpoint of knowledge. Thus, too, he could arrive at the proposition: "If there is in the world so absurd a dualism between knowing and believing, then there is no scientific knowledge of the world." Why not, if science keeps exclusively to knowledge? It is only the incarnate theologian who persists in thinking that the articles of his creed must also be taken into account. "A dualistic world is not an object of knowledge; only a world of a single principle can be known." But science knows nothing of a dualistic world, for to it all life in its idea rests only upon psychological processes, which, though they may be infinitely subtle and deeply hidden, yet follow in fine the same natural laws as all other psychical facts. So far the demand for monism is entirely justified. But if it is also proposed to remove the dualism of

point with the assertion that religions always fall, "if they are no longer believed," while works of poesy, if they are æsthetically satisfying, retain their value. Nearly the same thing might be said of metaphysical speculation, which has also, till now, maintained pretensions to unconditional truth, and whose disciples have formed a circle of believers. And yet even the most important systems have scarcely ever found an unconditional follower; and where this has been the case, as with Herbart's school, it testifies to a certain poverty and hardness in the whole circle of ideas. How many strictly orthodox Kantians have there been? Amongst the great minds that have mainly gained the system its renown, and that have been the most important bearers of its influence, scarcely a single one. Has not Hegel's system exercised an influence far beyond the circle of believers, and only borne its best fruits where it was handled with perfect freedom? What shall we say, moreover, of Plato, whose speculative imaginings still, after thousands of years, to-day exercise their mighty influence, while, even from his first successors onwards, no one has ever believed that his deductions are so strictly valid as they claim to be?

And then as to religions! Did not even in ancient days the Stoics for hundreds of years treat the popular superstition as the imaginative clothing of ethical ideas, and thus did more for the propagation of religious life than all the priesthoods? Jupiter, according to Lang, had to give place to Jehovah, Olympus to the Christian heaven, because the sensuous theology of polytheism ceased to meet the requirements of advancing knowledge, because a higher truth was recognised in the perfected

thought and poesy, feeling and willing, perception and creation, this is just as foolish as if for the sake of the unity of knowledge we should propose to abolish the antithesis of day and night. Thus, then, the antithesis of ideal and reality must remain; but scientific knowledge has only to do with the latter. It establishes unity by recognising that the ideal world is at the same time a psychological fact.

monotheism of Christianity. But had knowledge in the imperial age of Rome so much increased since the age of Sokrates and Protagoras? Were the masses ever more superstitious, the great ever more eager for miracles, the philosophers ever more mystical, than in the age of the spread of Christianity? And when, then, did that religion of Jupiter and the combined Olympus, that was then doomed to fall, ever exist? It struggled simultaneously and hand in hand with the commencing enlightenment painfully through against the old comminution of the national faith into thousands of local cults. The right of speculation to develop and shape religion might not indeed be announced in the market-place, but it existed, and the whole flowering time of Hellenic culture shows us poets and philosophers occupied in the development of religious doctrines and conceptions. In the local cult, indeed, absolute faith was demanded; but what else was this faith than the pious submission of the soul to the sacred story of one's own native city; what else could it be in an age when faith changed from town to town, from village to village, and when every educated man made it a strict rule to tolerate and to respect each faith in its own home? And was it, then, in the age of the spread of Christianity really the most enlightened minds, the philosophic thinkers, who first yielded to the new faith? Or do knowledge and reflexion play the chief part in the history of the conversion of eminent personages? Had the mass of the people really lost faith in the old gods, when they saw themselves compelled to adopt the new religion? History exhibits to us quite another process than that of a growing enlightenment: universal social decomposition, conflict and distress in all strata of society, world-weariness and unspeakable longing for a salvation which should not be of this world, are the true sources of the great revolution. Mere enlightenment might very well have attached itself to Jupiter and Olympus; they would have found it much

easier to deal with them than our theological reformers of to-day with their attempt to transform Christianity into a pure religion of reason.

"Why," asks Lang, "is it that in the Reformation the Catholic heaven with its saints fell and gave way to a far more colourless, much more unpoetical heaven?" The answer is again found in an advance of knowledge. But why is it, we ask, on the other hand, that this Catholic heaven amongst such enlightened nations as the French and Italians did *not* fall? Did Germany carry out the Reformation because it was ahead of all other nations in scientific knowledge, or has it in course of time been able to surpass the other nations in knowledge, because it had, from quite other reasons, broken down the ban of the hierarchy and of absolute unity of faith? When, finally, it is asked why the Protestant world is more and more turning away from orthodoxy, and when the answer is found in the influence of scientific discoveries, we must remark, on the other hand, that these discoveries come into the sharpest conflict just with what the reforming theologians propose to retain from the inventory of Christianity, while they are much more indifferent as regards other doctrines, as, *e.g.*, that of the vicarious sacrifice of the Son of God. It is a narrow strip of land surrounded by the waves, upon which the reformed theology tries to maintain itself against the waves of invading Materialism, and nowhere is speculative imagination more necessary than just here, if a few dogmas must still be maintained. Lang himself, immediately after the criticism he directs against us, claims the fatherhood of God for his religious needs. But his God is nothing but "the ground of all existence, eternally complete within itself, and exempt from all the changes of the processes of the universe." He works no miracles, he has no human sympathies, he does not trouble himself in detail with the weal or woe of his creatures, he nowhere interferes with the course of natural laws; his existence rests merely upon this, that, in opposition to

Materialism, there is postulated, besides the mere totality of all that exists, also a special ground of it, and then from this ground of all existence is made a 'father.' Why? Because the soul cannot but imagine to itself a being that loves us personally, and that stretches out its strong arms to us when we are in need. Can we ask a stronger testimony of the imaginative element in religion?

Homer did not always maintain his value, but he regained it when a generation arose that knew how to prize him, and the gods of Greece came to life again with him. When Schiller said of them, "Ah! that which gains immortal life in song, to mortal life must perish!" he knew very well that it is the essential element, the spiritual core of the Greek theology, which has exercised its influence upon us, as it did upon Sokrates and Plato.

CHAPTER III.

THEORETICAL MATERIALISM IN ITS RELATION TO ETHICAL MATERIALISM AND TO RELIGION.

THE Materialism of antiquity was, in its ripest form, directed immediately and openly against religion, the complete annihilation of which Lucretius considered to be the most important business of man. The Materialism of the last centuries frequently betrays the same tendency, but it only rarely shows itself openly, and, when it does so, is usually directed rather against Christianity than against religion as such. The thought of a gradual purification of popular belief from all superstitious elements has taken such deep root, that most of the adversaries of superstition involuntarily exhibit this tendency, even where their proper principle goes much further. Since Voltaire pursued the Church and the Church's creed with implacable hate, although anxious to retain belief in God, the shock of the storm has ever been directed, above all, against orthodoxy, against the literalism of traditional dogmas; while the foundation of all belief, the feeling of dependence upon superterrestrial powers, is but seldom attacked, and is often expressly recognised. The philosophical modifications and interpretations, the artifices of translation and transference, which succeed in educing out of the 'ground of all existence' a loving Father, play a great part in the development of young clerics, a somewhat smaller one in the maintenance of a certain connexion between the

popular faith and the ideas of the educated, and hardly any at all in the attacks made upon religion by Materialists and other apostles of unbelief. The way in which scientific theology reconciles itself with dogmas is often strikingly ignored; the freer middle stand-points, the spiritualised conception of ecclesiastical traditions, are overlooked, and Christianity is pitilessly made responsible for all the crudities of the vulgar creed, and all the excrescences of extreme opinions. But for all this, a 'Christianity purified from all superstition,' a 'pure theology,' or even a 'religion without dogmas,' is very frequently admitted as an indispensable element in the life of humanity.

The effects of this kind of polemic are easily seen. The great mass of more or less enlightened theologians do not feel themselves at all hit by these attacks, and look down with disdain upon the 'want of science' in such opponents. Believers are hurt by the mockery against what to them is sacred, and turn away from all criticism, even in cases where, but for such attacks, they might themselves, perhaps, have been disposed to exercise it. The only conquests are of minds that are hesitating and have long been strangers to belief, who are impressed by the confidence of the new apostles; while all those are strengthened and still more embittered against believers, who already belonged to the party of Materialism and of radical enlightenment. The result is an exacerbation of the oppositions that distract the life of our people, an aggravation of the difficulty of the peaceful solution of the problem of the future.

Very different must be the effect of a polemic which should seriously and decidedly dispute the very continuance of religion. Our own age, it is true, still offers material enough for the Lucretian 'Tantum religio potuit suadere malorum,' and it would be well worth while for once to examine more closely the relation between the fruits of the tree and its roots. If able and pious theo-

logians, like Richard Rothe,[13] can entertain the thought that the Church must gradually be absorbed in the State, it would be well for the freethinkers, on their side too, to subject to a strict criticism the dualism of political life and of religious community, instead of blindly transferring the old forms into an entirely different content. We have recently seen a fraction amongst the 'Free Congregations,' not only throwing overboard every remnant of the old articles of faith, but even finding a special sign of progress in the rejecting of the solemn and ceremonial performance of certain acts which have reference to the relation of the individual to the religious community. 'Baptism,' for example, which hitherto has been combined with a solemn exhortation to the parents as to the training up of the child, and with a recommendation of the child to the goodwill of all the members of the congregation, was given up, because it contained an unnecessary interference of the clergyman, and, therefore, a remnant of priestly authority. Ronge, Baltzer, and other former leaders of the movement, who adhere to definite although very general doctrines, and correspondingly simple forms of worship, are frequently treated by men of this school as arrogant priests, and are almost ranked with the infallible Pope.[14] At the same time, congregations continue to be formed, preachers are appointed, and edification is found, as far as it may be found, in the monotonous repetition of negation. Frequently, indeed, the limit between congregation and association becomes vague, partly, it is true, through the fault of the state, which still opposes great hindrances to the freedom of associations, while it allows the formation of religious communities with an infinitesimal minimum of religion. Sometimes men have appeared as preachers in such con-

[13] Comp. Stille Stunden, Aphorismen aus Richard Rothes handschriftl. Nachlass, Wittenberg, 1872, S. 273 ff., 319 ff.

[14] Comp. the essay Die neue Bilderstürmerei, in the paper Neue religiöse Reform, Darmstadt, 1874, Nos. 29–31, by Johannes Ronge.

gregations who scarcely conceal their repugnance to any and every form of religion. If, however, we consider their writings, we find them holding by preference to the uttermost extremes of orthodoxy and pietism, and only exhibiting their radicalism in audacious raillery and satire, while it never occurs to them to submit the justification of religion itself to a thoroughgoing criticism of principles which shall also embrace free standpoints. For the ideal side of religious life we find amongst these people simply no sense, and the rejection of everything that cannot be shown to the common understanding to be true is regarded as a matter of course.[15]

The same one-sided predominance of the rational principle betrays itself in the attempt of a decided 'Naturalist' to form a religious community of 'Cogitants;' yet here there appears a new element, which may be shortly described as a decided protest against ethical Materialism. The Cogitant community of Dr. Löwenthal is intended to be a 'union of social and humanitarian cultus,' a society which, on the one hand, makes thinking and knowledge themselves the objects of cultus, but, on the other hand, is based on the cultivation of human dignity and human affection.[16] Dr. Edward Reich lays still greater stress on cultus and ceremonies, a writer who in a series of works has advocated the Materialistic theory, and who at the same time in a special treatise has sketched the plan of a 'Church of Humanity.' Reich proposes to provide, moreover, for the needs of the soul and the poetical feeling in man, and, accordingly, is not sparing of festivals and festal hymns, of choirs, and imposing processions. Symbolical acts, elaborate church decorations, vows, and consecrations lend the religion of "everlasting light" a

[15] Comp. inter alia, Dr. Friedr. Mook, Das Leben Jesu, für das Volk bearbeitet, Zürich, 1873.

[16] Comp. the first numbers of the periodical published by Löwenthal in 1865, Der Cogitant, Flugblätter für Freunde naturalistischer Weltanschauung. The editor, Dr. Löwenthal, is author of the book, which has gone through several editions: System u. Gesch. d. Naturalismus, Leipzig, 1862.

pomp that cannot be paralleled in existing religions; drums, trumpets, and cymbals unite with organs and carillons to give a higher impulse to the religious feelings of the crowd of worshippers.[17]

It is Comte who has carried furthest the idea of this worship of humanity, and on his system religion would assume a much larger place in the life of individuals and nations than ever before. Two whole hours in the day are dedicated only to prayer, which consists in an effusion of feeling, with which we call up within us the ideas of reverence, of love, and of dependence under the figures of mother, wife, and daughter. Public worship demands four-and-twenty festivals in the year, and has nine sacraments at its disposal. But the most remarkable feature, besides a hundred oddities of a harmless kind, is the decided predilection for a hierarchical guidance of the people.[18] In the case of Reich, too, we have a hierarchically organised priesthood, and the religion of the Cogitants has, at least, its 'Cultus-magister,' who is clothed with a certain official authority.

Here, then, is taken up a factor of the 'outlived' Christian religion, which is unquestionably one of the most doubtful and dangerous of them all—Organised Priesthood and Official Authority. We may very seriously ask ourselves whether our decision must not be quite otherwise, if we had the choice, either to retain certain untenable dogmas and mystical and obscure articles of faith, and in exchange to be able to break up the hierarchy, or, while attaining complete rationalism as to dogmas, to submit again to the fetters of the hierarchy?

Are not the psychological laws which make every hierarchy, every priesthood, that is elevated above the people, ambitious of power, and that awake in it jealousy of the maintenance of its authority, immutably based in human nature and independent of the content of the creed?

[17] Reich, Die Kirche d. Menschheit, Neuwied, 1873.

[18] Comp. Mill, Auguste Comte and Positivism, London, 1865, p. 140 ff.

In fact, we find this inevitable effect not only in the great typical forms of the Tibetan, the Mediæval Christian, and the old Egyptian hierarchies, but, as is shown by recent ethnographical inquiries, even amongst the smallest religious groups of the most remote peoples, among the most degenerate negro races, and on the smallest islands of the Pacific.

If we would suppose that complete enlightenment in the sphere of theory would afford protection against this phenomenon, yet it must first be shown whence a power is to come that would supply so strong a counterpoise to the involuntary and insidious lust of power. It can hardly be inferred from purely theoretical considerations, and whatever may be said of the purifying power of truth, yet it has nowhere proved itself to be equal to this task. The Reformers, too, believed that they had comprehended all truth and got rid of all error; and what ambition, intolerance, and persecution did not all the same manifest themselves among the Lutheran clergy, until they were subdued and held in check by the preponderance of the modern state! If, perhaps, it is supposed that the ecclesiastical dogmas of absolute enlightenment would no longer afford matter for great and embittered controversies and heresies, let us only consider for a moment the scanty scientific doctrines which Ronge holds to be important and irrefragable enough to be adopted into his religious handbook for the instruction of the young.[19] Here we find very many assertions that have partly been recognised as erroneous, partly been rendered very doubtful by the advance of science. Such errors are, indeed, constantly forcing their way into our schools or being spread by popular scientific literature, and they often maintain their ground with astonishing tenacity. Views as to the

[19] Religionsbuch für den Unterricht der Jugend, 1 Thl. Die Gesetze der Natur sind Gesetze Gottes und in Harmonie mit den Gesetzen der Sittlichkeit, oder die natürliche und sittliche Weltordnung Gottes als freies Vorbild unserer Lebensordnung. Frankfurt a. M., 1863. (With *black* wrapper. Why?)

existence of a central sun, as to the self-complete system of the Milky Way, which repeats itself in the nebular masses, as to the habitability of the majority of the planets by "rational creatures like men," as to the comets as transitional forms in the formation of planets, and many such views long float in this way in the opinions of men, without very much harm being done. But if such propositions receive a religious consecration, and if, finally, such a religion is maintained and cultivated by a priesthood jealous of its authority, they must become much more fatally rooted, and it becomes quite impossible to see whether pure natural science could exist at all for any length of time. What conflicts might arise through the first appearance of great principles such as that of Darwinism! Even as it is, it produces conflicts; but how harmlessly they run their course compared with religious controversies of any kind, and how much more harmlessly still would they be carried on if it were not that, even as it is, references to religion bring with them a certain bitterness.

When the state at last determines, agreeably to its natural function, to introduce instruction in natural science into all primary schools, a great and beneficial advance will have been attained. The chasm between the modes of thought of the people and those of the educated will be lessened, the independence of each individual citizen, the capacity to resist delusions and superstitions of every kind, will be increased, and the relation of science to religion must gradually take the same shape as that in which it now exists amongst the educated, without any conflict of views being provoked. The more unconcernedly and positively, without any polemical *arrière-pensée*, such instruction is imparted, the more favourably must the process of accommodation between the old and the new views be brought about. But a Church or a religious community of any kind whatever cannot possibly deal with the matter so harm-

lessly and unconcernedly. It will give to doctrines a consecration and a weight which they do not require, and the more deeply it impresses details, all the more will it modify the spirit of the whole.

For the propagation of theoretical insight and enlightenment we do not want any emotional fervour at all. It is not even beneficial; for it is in the utmost calm of quiet and methodical inquiry that correct knowledge is most quickly and most easily found. Just as little does the truth require a great international association; it forms one itself, and breaks down all social and geographical limits.

It is otherwise with morality, with the purification of the desires, and with the direction of the impulses towards the general good. But even here mere moral teaching will hardly be likely to produce a frame of mind to which trumpet-peals and hymns are appropriate. All religion, like all poetry, connects itself with human joys and sorrows, with fear, longing, and hope; and though it is often mentioned, to the disparagement of religion, that it has sprung from fear and covetousness, yet we may set off against this, that for that very reason religion is fitted to purify and to ennoble fear and covetousness. Whether, however, the natural incidents of human life, birth and death, marriages and misfortunes, suffice for this, is very doubtful. If the object of the emotions is to be transferred from the present to a distance, and our impulses to be thus directed from the finite to the infinite, then mythus asserts its rights. A material which on the one hand is genuinely human, while on the other it stirs our hearts by pointing to the divine and the eternal, forms the basis with which the ethical tendency of religion is indissolubly connected. The tragedy of the suffering Son of God has therefore perhaps, from the mysteries of the ancient Greeks down to the offshoots of Christianity in Protestantism, been a more essential constituent of the truly religious life than all other traditions and

dogmas. But such a material cannot be made. It must grow. If we need it no longer, then it becomes very questionable whether we need religion at all any longer.

A certain cultus of humanity has already been set on foot, but fortunately it contains no germ of an ecclesiastical system with fixed forms and a separate priestly caste. Festivals in memory of great men, of the foundation of important centres of culture, of the establishment of benevolent institutions and associations, great national and international assemblages for the cultivation of science and art or for the advocacy of important principles, are much healthier beginnings of an age of humanity than the arbitrarily composed calendar of saints of Comte and the festivals of 'Harmony' of 'Great Men,' &c., which Reich proposes to substitute for Christian festivals. But though even here we can recognise a beginning cultus of humanity, yet this has nothing of the essence of religion in it. We have already mentioned the absence of the exclusive priestly order; but in its inner aspect, too, the spirit of these new preparations for the elevation of the heart and the union of forces in the struggle for the high aims of humanity is utterly different from everything that we are accustomed to call religion. In great men we celebrate not dæmonic beings on whose favour we feel ourselves dependent, but splendid flowers and fruits from a tree of which we ourselves, too, are part. Even the undoubted dependence of our thoughts and feelings on the forms which have been expressed by the great minds of the past is not conceived in the sense of religious submission, but as a joyous recognition of the sources of life from which we draw, and which are ever and ever bubbling forth and promising to pour forth constantly new and fresh life.[20]

[20] Stuart Mill, in his just published Essays on Religion (Lond. 1874), calls the sentiments which we entertain for the good of the human race and the moral elevation by the thought of great men or our dead friends a real religion. At the same time he declares the essence of religion

Thus it appears that Theoretical Materialism not only proceeds most consistently, but also aims at the comparatively most favourable result for the spiritual future of mankind, when it rejects religion altogether, and leaves the charge of morality and humanity partly to the state, but partly also to private efforts. A great part of the functions which now fall to the Church will then devolve upon the School; but care must be taken that this does not become an exclusive institution, directing mankind, and as it were entering upon the vacated inheritance of the Church. This would only produce a new priestdom. Only as an organ of the state, and as the free undertaking of self-conscious social circles, can the School attain a development which secures the progress of true culture and genuine morality, without bringing with it the dangers of hierarchical authority and the ambition of a scheming corporation.

But now we must further ask whether the last consequence of Theoretical Materialism must not carry us still further, and, with the rejection of all ethical aims in the state, tend towards a social atomism, in which each individual social atom would simply follow its own interests?

In answering this question, we must not, on the one hand, be led away by the mere analogy of Atomism with extreme Individualism, nor, on the other hand, would it be sufficient to point to the protest made by Materialists against this consequence. The analogy, quite apart from its inadequacy as a principle, would not lead us far, for the Materialist recognises the things which are formed from the atoms, and which in virtue of their form react as a whole upon the motion of the parts. Why should he

to be the strong and earnest direction of the emotions and desires towards an ideal object, recognised as of the highest excellence, and as rightfully paramount over all selfish objects of desire. Measured by this standard, all Schiller's dramas and two-thirds of his lyrics are religious poetry. Nay, even poetry itself, conceived at its true value, becomes identical with religion, while it must be ranged under a wider conception.

not also recognise social formations, which, as a whole, determine the course of particular individuals? The protest of the Materialists, however, cannot decide this question, just because it is a question not of persons but of principles. Though there may be Materialists who make their peace with existing religions, or would like to establish a new religion, while others wish to destroy the basis of all religions by means of Materialism, it might be just as possible for all our present Materialists to protest against Ethical Materialism, while a later school should adopt it as a necessary and correct consequence. Historically Ethical Materialism has been developed amongst the money-making classes; Theoretical Materialism amongst men of science. The former has gone excellently with ecclesiastical orthodoxy, the latter has almost always worked in favour of enlightenment. At the same time, there might exist a deeper connexion, which should make both phenomena, as the result of the same condition of civilisation, proceed from essentially the same sources. Rising at first apart, they would only gradually reveal their internal connexion, and end by a complete union.

The protest of the Materialists is, of course, quite justified against the view which by Materialism understands only the 'pursuit of sensual pleasures.' The unrestraint of sensual appetite is chiefly a matter of temperament and education, and is in principle, though not in practice, irreconcilable with any philosophical standpoint. Even though the individual sensual pleasure, as with Aristippos or Lamettrie, is raised to a principle, *self-control* still remains a requirement of philosophy, if only in order to assure the permanence of the capacity for enjoyment; and conversely, even when the principles of a philosophy are extremely ascetic, sensual appetite frequently enough asserts itself in its disciples, either in open violation of their own principles or in the tortuous labyrinths of self-delusion.

We have seen in the First Chapter of this Section that the love of pleasure cannot be regarded as a conspicuous feature of our age; much rather is it the most inconsiderate regard for self-interest, especially in the sphere of money-making. The principle of exclusive regard for self-interest, which we have found to be the essence of Ethical Materialism, is indeed not seldom found in combination with Theoretical Materialism; thus, *e.g.*, in Büchner, in the first edition of 'Force and Matter;' much more frequently, of course, amongst those Materialists who write no books.[21]

What decides the question of a connexion is, however, neither the historical view nor the collection of voices from the present, but an inquiry whether an ethical principle may be naturally established according to the views of Theoretical Materialism, and conversely whether Theoretical Materialism can still be harmonised with a given ethical principle. We have already found that from a rigidly Materialistic view of things by no means only the principle of Egoism may be deduced, but also the great counterpoise to it — Sympathy. Both principles, without any influence of transcendental ideas or superstitious assumptions, may simply be deduced from the sensuous nature of man, and he who favours them may still be, in the full extent of the word, a Materialist. Kant's moral principle must, however, at least be brought down from the height of its *a priori* validity, and be established on a purely psychological basis, if it is to be harmonised with Materialism; and conversely no one who is convinced of the apriority of this moral law can remain at the point of Theoretical Materialism. The question as to the origin of the moral law will always lead him beyond the limits of experience, and he cannot possibly regard a picture of the world which rests simply upon experience as complete and as absolutely correct.

[21] Kraft u. Stoff, Frankfurt, 1855, S. 256 f.

But even sympathy is not the same thing to the Materialist as to the Idealist. Büchner says in one place that sympathy is at bottom only a "refined egoism," and this may, in fact, be very well admitted, at least for his Materialistic conception of it.[22] Then sympathy naturally begins in the narrowest circles of common interests, *e.g.*, in the family, and it is consistent with the grossest egoism towards all beyond this circle. The Idealist, on the contrary, is at a bound in the universal. The bond which links him to his friend is only the nearest link in an infinite chain, embracing all creatures, 'From the rude Mongol,' as Schiller says, 'to the starry Greek, Who the fine link between the mortal made, And Heaven's last Seraph.' The natural feelings which awake in narrower circles are forthwith referred to a universal cause and connected with an idea which claims unconditional validity. The image of an ideal perfection springs up in the soul, and the contemplation of this ideal becomes a guiding star in all his acts. Theoretical Materialism cannot, without inconsistency, rise to this standpoint, because to it this starting from the whole and from a general principle existing before all experience, is an error. The Materialist cannot follow Schiller's words: 'Take courage, then, in erring and in dreaming;' for the exact correspondence of his picture of the world with the results of understanding and sensibility is his highest law.

Capable, therefore, as Materialism may be of deducing from its principles all the virtues necessary to the existence of society, yet here too the psychological law will assert itself, that in the application of our principles the first starting-points always attain a certain preponderance, because they are oftenest repeated, and most deeply impress themselves on the mind. The spread of the Materialistic theory of things will on this ground also necessarily favour the continuance of Ethical Materialism, just as conversely

[22] Die Stellung d. Menschen in d. Natur, Leipz. 1870, S. cxliii f.

the worshippers of egoism as a moral principle gradually see themselves drawn to Materialism, even though they have originally held quite other theoretical views.

In fact, we can hardly fail to recognise already that the philosophy of those circles which seek above all things to make money, and which favour a practical egoism, more and more incline to Materialism; while the theoretical Materialists are fond of attacking those features of Christianity which form so sharp an opposition to the spirit of modern industrial acquisition. Amongst the attacks which have quite recently been directed not only against the mythical traditions of Christianity, but also against its morality, that is not the least prominent which characterises Christianity as a religion of the envy and hatred of the poor against the rich.

All these reciprocal relations and connexions will become still clearer to us, as we proceed to consider the theories of things held by two men, who are distinguished by consistency and clearness of thought as well as by philosophical training, and who only in their riper years decidedly leaned to a Materialistic theory of things. We shall at the same time be presenting what may be a welcome complement to our History of Materialism, since at least one of the two systems has quite recently created a great sensation, while the other is here first given to the light from the stillness of a correspondence: we refer to the systems of Friedrich Ueberweg, and David Friedrich Strauss.

Materialism is with Ueberweg, as with Strauss, only the last result of a long development. This may appear surprising, as Materialism represents naturally the first and crudest form of philosophy, from which it is easy to pass on to Sensationalism and to Idealism, while no other self-consistent standpoint can, by the mere widening of the sphere of experience or by logical elaboration, be resolved into Materialism. Nor, in fact, was this the course of the development, although we shall see that Darwinism

exercised upon both men a considerable, and perhaps decisive, influence. On the contrary, Ueberweg as well as Strauss at the beginning of his speculation found himself through tradition and the course of his studies upon sloping ground; they had thought themselves into a theory of things which was neither objectively tenable nor agreeable to their subjective disposition and inclination. Their advance from one stage to the other was, therefore, essentially a process of decomposition and a final rest on the apparently firm ground of Materialism.

Ueberweg was from the first as it were predestined to Materialism by the decided aversion to Kant[23] which guided him from the outset in the working out of his own views. As a disciple of Beneke, who started from the English philosophy, and regarded psychology as the fundamental science, Ueberweg, even while a student, represented, as against his master, a naturalistic aspect of this psychology. But he stood, at the same time, under the powerful influence of the Aristotelian Trendelenburg, and thus, in fact, it was essentially elements of the Aristotelian philosophy that separated him from Materialism, and the gradual overcoming of which determined this transformation of his way of thinking. We may distinguish three stages in this movement: the first, in which the teleological principle still has its full force with him; the second, in which it is in conflict with his naturalism; and lastly, the third, in which it was completely broken down.

How far Ueberweg at the first stage was still removed from Materialism may be shown by the following brief sketch, which Dr. Lasson, an intimate friend and indus-

[23] Comp. my memoir: 'Friedrich Ueberweg, Von F. A. Lange, Berl. 1871,' (repr. from the Altpreus. Monatss., Bd. viii. S. 487–522). The letter there mentioned from Ueberweg to Prof. Dilthey (S. 37), with special reference to Ueberweg's relation to Kant, was, in fact, addressed not to Dilthey, but to Dr. Hermann Cohen, the author of 'Kant's Th. der Erfahrung.' This letter was sent by Cohen to Prof. Dilthey, by the latter to Ueberweg's publisher, Dr. Toeche, and by the latter sent to me, without envelope or any particulars, among other materials.

trious correspondent of our philosopher,[24] gives of Ueberweg's conception of Metaphysic, at the time he was writing his Logic (1855): "It ought to contain a rational Ontology, Theology, and Cosmology. The introduction should consist of a Phenomenology, with reference to Logic. Ontology considers the empirically given forms, starting from the most abstract, and tests their reality and import. It is divided into the theory of Being in general (Time, Space, Force, and Substance, corresponding to Perception); of Being-for-self (Individual, Species, Essence, and Phenomenon, corresponding to Intuition and Idea); and of Being-together (Relation, Causality, Purpose, corresponding to Judgment, Inference, System). Then Theology (general rational Theology) considers on the basis of these ontological expositions the proofs for the Existence of God, and also the Nature of God. Cosmology seeks to explain the world and its forms from the Nature of God and the Purpose of Creation. The world is considered as the Revelation of God, as the representation in time and space of the eternal and indivisible perfection of God."[25]

One would gain, of course, from these constructions, which almost remind us of Hegel, a very imperfect notion of Ueberweg's views at that time. The Materialistic trait in his philosophy, which is entirely concealed in this survey of Metaphysic, was at that very time very considerably developed in the plan of his Psychology, which he would have liked to take in hand immediately after the Logic. I made Ueberweg's acquaintance in the autumn of 1855, and in my almost daily discussions with him heard a good deal of this Psychology, but

[24] I may take the opportunity to make a slight correction in my Memoir. On p. 16, instead of the 'Herbartian Lazarus,' Dr. Lasson should be written. Ueberweg frequently called him 'Lazarus' in his letters, as Dr. Lasson before his conversion to Christianity was called Lazarussohn.

[25] Lasson, Zum Andenken an Friedr. Ueberweg, Berl. 1871, S. 20 (reprinted from Bergmann's Philos. Monatsh., Bd. vii., H. 7).

nothing of the Metaphysic. Whether even then he had already begun to waver in his metaphysical and theological views I cannot say. At all events, the wavering followed very soon after, while, on the other hand, he remained undeviatingly firm to his fundamental views on Psychology.

This Psychology is a very paradoxical one, though it rests upon a substantial series of inferences, which we will here reproduce as briefly as possible.

The things of the world that appear to us are our ideas. They are extended; therefore our ideas are extended. The ideas are in the soul, therefore the soul too is extended, and, moreover, the extended soul is also material, in accordance with the notion of matter as an extended substance. We cannot have ideas outside the soul; therefore our soul reaches as far, and farther, as the entire sum of all the things that we perceive, including sun, moon, and stars. It is now very probable, in accordance with strong analogies, that these worlds are not produced in the soul without external causes, and that the occasioning causes (Ueberweg's 'Things-in-themselves') are not indeed the same as the phenomena, but at least very similar to them. The image of the camera obscura leads to the previously described hypothesis of a comparatively gigantic and perhaps inverted world, which mirrors itself in the corresponding world-pictures of individuals. If the soul, as a 'thing-in-itself,' is material, it must be supposed that things in themselves are so generally. We have then a material body with a material brain, and in some small portion of this brain lies the space in which our ideas are formed, and which, therefore, as a simple, structureless substance, embraces the world of our phenomenal things.[26]

We have already mentioned how Ueberweg believed that he could demonstrate with mathematical rigour that

[26] Comp. supra, p. 210; and my memoir of Ueberweg, S. 12 ff.

the world of things in themselves must be in space, and, like our phenomenal world, must have three dimensions. It still remains to exhibit his views of matter and its relation to consciousness.

Ueberweg did not admit atoms, but a continuous filling of space by matter, and he attributed to this matter in all its parts the capacity to be moved by mechanical forces, and then to attain 'internal states,' which are produced by the mechanical movements, but can also react upon them. The internal states of our brain-matter are our ideas; those of lower organisms and of inorganic matter he conceived to be in a similar relation to our consciousness, as Leibniz may have conceived the 'ideation' of the lower monads related to that of the higher; only that with him the dreamy, or even less than dreamy, ideation of inorganic matter was not, as with Leibniz, an imperfect representation of the universe, but it was something simple and elementary; bare sensation, or a weak analogon of sensation, from which with a more perfect organisation of matter there were formed also the more perfect psychical products.

Here now the point can be sharply indicated at which Ueberweg's views at that time separate from Materialism. If we suppose that the 'internal states' of matter are absolutely dependent upon external movement, then we have a decided Materialism, equal or even superior to the atomistic theory. It is not necessary to give up all reaction of the internal states upon the motion of matter, but the reaction must result according to the mechanical equivalents of the previous effects; in other words, the law of the persistence of force must be applied to organisms as well as to the inorganic world; the movement of all bodies must, with the intercalation of internal states, result just the same as if there were no internal states. But this view was at this time certainly not Ueberweg's view. He assumed that the law of the

persistence of force is interrupted by psychical processes.[27]

What forced him to this assumption was, above all, his adhesion to the Aristotelian teleology. As soon as Ueberweg gave this up, his system must necessarily pass into Materialism. So long, that is to say, as there arise in organisms out of their idea forces which determine their form, this form cannot be exclusively a product of the physical and chemical forces. In human thought, moreover, the succession of ideas is entirely freed from the physiological basis. The thoughts are, indeed, in a certain sense properties of the brain-matter, but they follow purely logical laws, and can produce a final result, which is quite incapable of being explained by the mechanical conditions of molecular change. This hypothesis, too, is in so far teleological, as in Aristotle the end is at the same time the guiding thought to which all the other logical elements must be subservient. If man is to fulfil his destiny, the thought of his rational life-purpose must attain the mastery without any reference to matter.

Upon teleology he based also his assumption of a God consciously ruling the world; but it was just here, too, that he first began to waver. In the anonymously pub-

[27] Again, in a letter of 9th January 1863, Ueberweg tries to show that we have mere mechanism only when the internal states of matter remain unaltered and exert no influence on the direction of the motion. This, however, in the case of psychical processes, seems to him very improbable. Yet he will not dispute the 'scientific justification' of a hypothesis that seeks to explain all movements only in accordance with the law of the persistence of force, and therefore on purely mechanical principles. It is, in fact, time that this hypothesis should be proposed, and he who should carry it out in the best possible way would gain a permanent place in the history of psychology. Prof. Dilthey unjustly supposes in his essay, Zum Andenken an Friedr. Ueberweg (Pr. Jahrb., Bd. xxviii.), the following proposition to be Ueberweg's view: "And in fact it is at every point the same real fact which appears in a twofold shape, as a psychical fact and as a fact of motion." This view Ueberweg frequently distinguishes from his own as the *Spinozistic* view, on which the internal states are indeed excited by external motion and exert influence upon its direction, but are not identical with it.

lished 'Sendschreiben des Philalethes,' his primary effort is to save the mere *possibility* of the existence of God against the argument derived from the form of the universe; only in the second place does he try from teleology to establish its reality. The objection referred to might perhaps, to many people, have had but little weight, but for Ueberweg himself it was almost crushing. The analogy with the internal states of the animal world, and especially of man, must of necessity lead him to assume also for divine thought an analogous concentration of the elements of consciousness distributed in the universe, and for this he needed, just as Du Bois-Reymond demands, a world-brain and nervous system. The weaknesses, too, of the teleological system were not unknown to him, although he still steadfastly defended it. Thus he wrote to me in a letter of the 18th November 1860 as follows:—"I know very well that the purely subjective meaning of the notion of finality is often maintained; but even this is very doubtful. Whoever stands in this point on the side of Spinoza must show how the phenomena of organic life, which we can most conveniently explain by the aid of this notion, are at all conceivable without it. 'Causality,' at least, is commonly taken objectively; but the mere accumulation of atoms alone will certainly not help us out of the difficulty. Hegel's 'immanent finality,' 'creative idea,' however, holds an uncertain mean between atomism and theology, and points to something beyond itself. Kant's theory is inseparable from the general theory of Kantianism, which, as a whole, as it is presented in the three 'Criticks,' is not tenable, and with Fichte becomes only more wild. I am almost in the same strait in which Herbart found himself: on the one hand, the hypothesis is necessary; on the other, either impracticable (according to Herbart's metaphysic), or at least scarcely practicable (from Fechner's standpoint and mine). Help me out of this strait and I will be grateful to you; but for this it is

not enough to prove to me to be improbable what I myself recognise to be in itself little probable, but you must open to me some other prospect which may appear to me to be even slightly plausible. I know of none."

In reference to the existence of God he writes in the same letter: "Do not suppose, however, that my only object, or even my principal object, has been to save a personal God, as it were, at any price. As to forms of worship, there is no doubt amongst intelligent people that they must contain much that is anthropomorphic, and that, therefore, has only poetical validity. But if anthropomorphism is to have a religious justification, then something must have reality that is anthropomorphically presented; and it is an important question for the philosopher and for all religious communities based upon philosophy, what it is that poetic representation thus embellishes. The unity of the universe? But in what form has this objective existence? Of the human mind? What is the relation of the universal to the individual mind? &c., &c." Farther on he observes that he had been more concerned (in the 'Sendschreiben des Philalethes') for the discussion itself than for its result. He wished, at the same time, to show to those who wish to be liberal, but who have a horror of 'Atheists,' that indeed irrefragable considerations make the assumption of a God plausible, but also that difficulties mountain-high pile themselves up against it, and therefore that room must be allowed for a free discussion.

This second stage of Ueberweg's development, that of hesitation between Materialism and teleology, I have made the basis of my account of his philosophy in the Memoir published at Berlin in 1871. I did not consider myself justified by the few traces occurring also in my correspondence with him of a decision in favour of Materialism to proclaim this as the last result of his philosophy; especially as the Ueberweg portrayed by me was as it were the official Ueberweg, the author of the so

widely appreciated and admirable text-books, the many-sided, keenly criticising, and yet everywhere so tolerant thinker. Soon after the appearance of my little biography I received several letters from Dr. Czolbe, the well-known Materialist, who was Ueberweg's most intimate friend in Königsberg, and who till the last daily associated and philosophised with him. Czolbe disputes in these letters that Ueberweg had retained any weakness for the Aristotelian teleology; he disputes that Hartmann's 'Philosophy of the Unconscious' excited any sympathy in him, and maintains that Ueberweg had become a decided Darwinian. Then he goes on in a letter of the 17th August 1871: "He was in every way distinctly an Atheist and Materialist, though in his official position as professor he regarded it as his chief duty to impart to students the knowledge of the history of Philosophy and skill in Logic. He belongs essentially to your History of Materialism, and is to me a brilliant illustration of the absurdity of the opinion held by certain theologians and philosophers, that ignorance, stupidity, and vulgarity are the basis of Materialism. It would meet with Ueberweg's complete approval that you should number him among the Materialists." [28]

The voucher for this consists of four letters of Ueberweg to Czolbe,[29] who was then staying in Leipzig, dated the 4th January, 17th and 21st February, and 16th March 1869. In the letter of the 4th January Ueberweg writes, *i.a.*: "What happens in our brain would not, in my view, be possible, unless the same process, which here appears most powerfully or in the greatest concentration, in a like way, only in a much slighter degree, took place

[28] It is hardly necessary to say that I judge Ueberweg's character in this respect just as Czolbe does. I am convinced that if Ueberweg had foreseen his death (he hoped, according to Czolbe, to recover down to the last moment), he would have had no rest until his essential views in their full connexion had been written down for publication.

[29] These letters, with some others, were given to me by Czolbe to be made the fullest use of, and therefore have remained among my papers after Czolbe's death.

quite universally. A pair of mice and a meal-tub—you know that I have often used this illustration. If well fed, these creatures multiply, and with them sensations and feelings; the few of which the first pair were capable cannot simply have been diluted, for then their descendants must feel less strongly; therefore the sensations and feelings must be present in the meal, even though feebly and weakly, not concentrated as in the brain: the brain acts like a distilling apparatus. But if the sensations and feelings in the creatures' brain are excitable by means of vibrations, we cannot see how they could have acquired this property unless it belonged to them from the beginning, that is, in some slight degree already existed in the meal-form (that is, while they were still meal or in the meal)." Farther on in the same letter: "In a certain sense, you say with justice, I entirely give up matter. My view is just as much on the one hand 'crassly Materialistic' as it is on the other exclusively Spiritualistic. Everything that we call Matter consists of sensations and feelings (only not as the Berkeleians will have it, merely of our own), and is in this sense psychical; this psychical, however, is extended, therefore 'material,' for matter is, according to its definition, 'extended substance.'"

The three remaining letters contain Ueberweg's Cosmogony, which is distinguished by the addition of a peculiar feature to the views of Kant and Laplace. Ueberweg, that is to say, endeavours (starting from an expression of Kant's) to deduce as necessary that two neighbouring planets or entire solar systems, or even larger cosmical units, must in course of time necessarily come into collision. The result will always be the same: ignition and distribution of matter through space, upon which the play of forces makes a new world-formation follow. Life, on the gradual cooling of the planets, disappears, but the collision sooner or later restores the heat, and there is no reason why life, though we do not know how,

should not reproduce itself from precisely the same causes from which it has been produced with us. The initial state of Kant and Laplace is therefore only relatively an initial state. It presupposes the collision of earlier worlds, and will infinitely often recur, as we have no reason to doubt the infinity of matter and space.

With this theory, as ingenious as it is capable of defence, Ueberweg went on to connect a further view, upon which he laid great stress, and which presupposes Darwinism. Through the successive collisions of worlds, according to Ueberweg, ever greater heavenly bodies must be formed; and if life is developed upon them, the struggle for existence must also assume ever greater dimensions, and thus ever more perfect forms must be produced.

If we combine these new features with the basis of Ueberweg's philosophy as above described, there results a consistent and self-contained Materialistic system. Whether it may in another sense be called at the same time 'spiritualistic,' may be doubted; for true spiritualism always excludes the strictly mechanical connexion of cause and effect in the universe. Ueberweg, too, very seldom dwells on this side of his philosophy, while in his letters he frequently, and by preference, describes himself as a Materialist. The idea that really consistent Materialism might be established on the basis of his theory, pleased him at a time when he had not fully decided on this change of attitude. Thus he quotes in a letter to me from Königsberg, on the 14th December 1862, the following epigram against Czolbe from the 'Walhalla deutscher Materialisten' (Münster, 1861):—

"Völlig ist Deine Vernunft noch immer zum Ziel nicht gekommen,
Da die unendliche Welt nicht Dir den Schädel erfüllt."

"Fully is thy Understanding not yet arrived at perfection,
Since this Infinite World cannot yet fill up thy skull."

On this he makes the following remark: "Had the poet known my treatise 'Zur Theorie der Richtung des Sehens,'

perhaps he would have felt called upon to compose a distich against me, since, in fact, I draw that very consequence. I should like to know whether he would then have kept the title 'Materialism is unworkable;' I should agree with him if he wrote, 'Materialism does not work' (with Czolbe and the rest)."

That we must credit Ueberweg with the conception of a comprehensive and original Materialistic system can thus not be doubted. At the same time, we may doubt whether Czolbe is justified in categorically describing Ueberweg as 'Atheist and Materialist.' To begin with, we must ask whether, if Ueberweg had lived longer, he would not have surmounted this standpoint also, and again given a fresh turn to his definitive system. As it appears to me, he had never fully made up his mind; and even in his last letters there is betrayed a certain inclination, if more time and leisure permitted, to revise once more whole important sections of his theory of things. As regards Atheism, Czolbe, despite his intimate friendship with Ueberweg, is here scarcely a quite competent witness. As Czolbe himself was, with all his Materialism, zealous for the Papacy, there were in this sphere few points of contact between him and Ueberweg; accordingly there are in Ueberweg's letters to Czolbe no traces of a discussion of the religious question. Ueberweg's Materialism still does not entirely exclude the hypothesis of a world-soul, and he does not require more, in order to attain to the worship of a God, than the existence of a being fitted to be transformed into a God in an anthropomorphic conception of it.

If now we put generally this question of the Ethical consequences of Ueberweg's theory of things, it may first be pointed out that in his political views he was essentially conservative. Of course, he did not favour the poisonous plague of reactionism which maintained itself so long in Germany as 'conservative;' but he went with the great stream of moderate liberalism, though with

decided personal predilection for monarchical institutions, and for the correctest possible solution of every problem on the basis of existing legal relations. This principle led him even to be a defender of legitimism, which seemed to him, as it were, to take the place of logic in politics. The right of ideas, as opposed to antiquated traditions, and, therefore, the right of revolution, he could not as a philosopher reject, but he wished to see it limited to the rarest and most undoubted cases of intrinsic necessity. The changes brought by the year 1866 caused him no uneasiness, as indeed he was, on the whole, uncommonly content with the course of events in Germany since 1858.

On the social question, he confessed, in the absence of special studies of his own, to an "instinctive sympathy with Schultze-Delitzsch." My books, written in quite a different sense, he read with attention; agreed with many ideas, especially in the purely theoretical discussions, but in all practical consequences returned as much as possible to the defence of the existing state of things.[30]

All the more radical was Ueberweg with regard to religious traditions. Even at the beginning of the second period of his philosophical development, he was occupied with the idea whether it was not his duty to join the Free Congregations; and he was only restrained by the reflexion, that he was fitted only for the professorial career, and that this exclusiveness of his natural disposition justified him in maintaining his position so far as he could do so without open insincerity.[31] Against positive Christianity he expressed himself all the more keenly in his letters, as he was oppressed by the consciousness that in his lectures and books he did not indeed say anything untrue, but also could not say the whole truth. In an unusually excited letter to me of the 29th December 1862, he says, amongst other things, that in order to secure

[30] Ueberweg set down his impressions on reading my 'Arbeiterfrage' —the first, still very defective, edition —in a letter of February 12, 1865.

[31] Ueberweg's letters to me of 18th November 1860 and 28th December 1861.

the recognition of the Reformation a bloody struggle of thirty years and more was necessary. He did not believe that communities resting upon a Materialistic theory would find recognition and security "until fanatical Materialists should have sprung up, ready, like the old Puritans, to set their lives at stake, and with joy to shoot down with grapeshot Catholic and Protestant Christians, as well as the old Rationalists, for thirty years long, if need be. Only afterwards, when the victory, the bloody victory is won, only then will it be a joyous and beautiful task again to make way for the principles of kindness and humanity. A purely religious war will not come, any more than the wars of Constantine and the Thirty Years' war were so; but I am quite convinced that, in no very distant future, the religious element and the antagonistic theories of the world will be very intimately complicated with political antagonisms and wars." [32]

Three years later, at a time when the theory of things of his third period had doubtless become fixed with Ueberweg, he wrote (in a letter to me of 31st December 1865) as to the religious question, for which he was more concerned than for the social question, as follows:—"A religion whose system of dogma shall contain nothing scientifically false I hold indeed (1) as possible, (2) as a necessity. But, my dear friend, 'in the name of God,' do not treat this proposition as equivalent to the other proposition, that religion must pass into science. Science and poesy must appear side by side in a pure religion, clearly separated and yet intimately united. This separation and this co-operation must take the place of the original unity, which becomes intolerable, and leads to the horrible dilemma of narrowness or of servile hypocrisy, according as the scientific consciousness of the age has got beyond it. . . . I do not hold it to be essential to

[32] I cannot even now abandon the psychological explanation of this excited letter which I have attempted at S. 22 of my Memoir. At the same time I must, on the other hand, now attribute greater importance to his hard judgment of Christianity than as that of a momentary discontent.

religion that we should continue in a state of childishness. No other 'dogmatics,' no other 'catechism,' than natural and historical science, conveyed comprehensively so as to direct the attention to the whole, to the order of the universe, and thus to complete the education of the school. But this teaching belongs as little to the pulpit as ecclesiastical dogmatics, as such, to Christian pulpits; the doctrine forms only the theoretical basis for the sermon, only the point of connexion for song and organ, or, if you will, pictures and ceremonies also. But with the clearest separation there must also exist an intimate relation." From the new theory he tries to show further there must also result a new religious Art.

Here, then, we have still the prospect of a worship quite analogous to that of Christianity. This evolution theory is somewhat differently put in a letter of the 28th April 1869. Here Ueberweg observes that the three functions, knowledge, feeling, and willing, only become more definitely separated with the progress of culture, and then appear Science, Art, and Morality, the Theoretical, the Æsthetic, and the Ethical, side by side. "Originally there exists a germinal interfusion (or, to speak in Schelling's language, an 'indifference') of them, and this primitive interfusion is essentially also the stage of religion. . . . The resolution of what is united in religion into these three forms (not the mere apprehension of religious ideas as æsthetic creations) would be the progress which is needed, agreeably to Goethe's saying—

"Wer Wissenschaft und Kunst besitzt
Der hat Religion;
Wer diese beiden nicht besitzt
Der habe Religion!"

"He who Science has and Art,
He has Religion too;
Let him who in These has no part
Make his Religion do!"

Here we may, in fact, ask whether Ueberweg, with regard

to religion, has not completely attained to the same standpoint as Strauss, whose views we shall presently consider.

An unmistakable difficulty of this evolution theory is that the theoretical, æsthetical, and ethical elements, which are supposed to develop from the 'germinal interfusion,' at the same time undergo a qualitative change, and become almost the opposite of what was contained in the religious germ. As to the theoretical element, it is quite needless to say anything more; but even the æsthetical and ethical requirements, which Ueberweg makes of the religion of the future, deviate very widely from Christian principles. I often tried to show that Christianity, in the first place, has still powerful roots in the life of the people, and in the next place is in some of its main features from psychological and social grounds quite irreplaceable. The man of philosophic culture who would really help the people forward must also remain in intimate union with them, and be capable of understanding how their hearts beat. But for this a religious and philosophical mediation is necessary, such as Kant and Hegel prepared; an art of translating religious forms into philosophical ideas. If this is genuine, then the emotional facts of worship must be essentially the same with the philosopher as with the believer. For the philosopher, therefore, to leave the Church is not only not a duty, but, on the contrary, he must be strongly urged not to do so, because thus an element in its nature tending to encourage progress would be withdrawn from the life of the people, and the masses would be helplessly abandoned to the spiritual domination of blind fanatics.

This 'isomorphism' of the emotional processes in the philosopher and naïve believer, Ueberweg would only admit as very slightly justified; no doubt, principally because he rejected in principle the emotional processes demanded by Christianity. As regards the æsthetical side of religious life, we were, of course, agreed that the

religion of the future must be essentially a religion of reconciliation and of joy, with a pronounced tendency towards the perfection of this present life, which Christianity gives up. As a result of this principle, Ueberweg rejected all the Christian poetry of pain and sorrow, together with all the heart-stirring melodies that belong to it, and with the sublime architecture of the Middle Ages, which was so dear to me. He reproached me with wishing to build the new Temple of Humanity in the old Gothic style; he wanted a new and cheerful order of architecture. I pointed out that, after all, we could not do away with social misery and the woes of individuals; that a deep meaning lies in the guilt of all, even the most righteous, and that an inconsiderate appeal to the will of the individual involves deep untruth and injustice. Accordingly I demanded, besides the gay temple of the religion of the future, at least my Gothic chapel for troubled souls, and in the national worship certain festivals, when even the happy should learn to plunge down into the depths of misery, and find himself with the unhappy, and even with the wicked, in a common need of salvation. In a word, if in our present Christianity sorrow and tribulation form the rule, cheerfulness and the joy of victory the exception, I would indeed invert this relation, but not ignore the dark shadow which, after all, rests upon our life.

I still remember very distinctly that one day I was saying that we must take over our best church hymns into the new worship, as the Psalms had been adopted into Christian worship. Ueberweg asked me what hymn I would propose to take from the Protestant hymn-book; and in full consciousness of our difference, I answered immediately, "O bleeding Head, so wounded!" Ueberweg turned away, and gave up any hope of agreeing with me as to the religious poetry of the Church of the future.

Almost as absolutely opposed was Ueberweg to the Christian ethics. He recognised, indeed, the principle of

love, and was ready to assign to it a permanent value; but love as *grace* must be all the more stoutly combated. It is characteristic that my book on the 'Arbeiterfrage' was the occasion of a sharp expression of his views on this matter (in a letter of 12th February 1865). He expects important social improvements, not from the carrying out, but, on the contrary, from the transformation, of Christian principles. "The rich man and poor Lazarus, giving to the poor, earthly resignation and the vengeance beyond the grave which the God who loves the poor wreaks on the privileged ones by the everlasting torments of hell, these are the fundamental ideas of the founder of the kingdom of Messiah, and Zacchæus knew very well what Jesus liked when he promised him to give away the half of his possessions. This is ethical dualism in the most decided shape. Mammon is unjust, as is his nature: not to serve Mammon, to look for alms from God and man, that is right; and if wicked men are too hard-hearted to give (or if they expect you to work rather than beg), there is no idea of a positive dignity of labour, but then misery is to be endured and forgotten in the opium-intoxication of ideas of the blessedness of the Messiah's kingdom, or of a life beyond this. Paul was too cultivated and too much accustomed to labour to have such crude ideas as Jesus of labour and mendicity, but with him the pitiable begging principle of Christianity struck inwards, where its effects were almost more mischievous; the *grace* of God took the place of self-conscious ethical action, the principle of revelation that of the labour of inquiry. For the first subjugation of barbarians the intellectual opium-intoxication might be useful; now its results are crippling and depressing." In the same sense he expressed himself in a letter of 29th June 1869, with reference to the criticism of the Christian morality in Valliss's [33] 'Doctrine of Human

[33] Die Lehre von den Menschenpflichten in ihrem Verhältniss zur christlichen Sittenlehre. Aus den hinterlassenen Papieren eines Philosophen herausgegeben von Rud. Valliss: Winterthur, 1868.

Duties:' "When the writer points to the defects of the Christian ethics, especially to the depreciation of labour (in the widest sense of the term), as compared with the favour shown to moral show-pieces, such as 'Love of our enemies' (coupled with the condemnation of opponents and of those who are the objects of envy to eternal torments in hell), to the sacrifice of independence and personal dignity in favour of servile subjection to the master, who is stamped as the Messiah, as the only-begotten Son of God, he has my full sympathy."

From this it will be obvious that Ueberweg put ethics as a science on a purely naturalistic and anthropological basis. The brief outlines of a system of ethics which Rudolph Reicke published from Ueberweg's papers (Königsberg, 1872), so far, however, approximate to the systems which rest on the assumption of an *a priori* principle of morality, inasmuch as Ueberweg bases his ethics on the *differences of value* between the various psychical functions. He divides them into two principal classes. "The difference between that which is useful and hurtful is shown by pleasure and pain; the difference between higher and lower functions by feelings of self-respect and shame." But if there is such an original feeling of the difference between lower and higher functions, then there is a natural conscience, and the inquiry will suggest itself, whether a connexion cannot be shown between the subjective basis of this conscience and an objective principle.

While Ueberweg was snatched away by death from amidst his labours and projects, David Friedrich Strauss had the good fortune to live out his life. By his own testimony in his last book he has also spoken the last word that he had to say to the world. But this last word is an adhesion to a Materialistic view of the world. He remarks, indeed, appealing to Schopenhauer and the author of the 'History of Materialism,' that Materialism and Idealism pass into each other, and at

bottom form only a common opposition to Dualism; but it is impossible to treat this relation as though it were indifferent from which point we start, or as though Materialism and Idealism were interchangeable at will. In truth, Materialism is but the first, the most obvious, but also the lowest stage in our philosophy; once passed over into Idealism, as a speculative system it entirely loses its validity. The Idealist can, and must in fact, in natural science everywhere apply the same conceptions and methods as the Materialist; but what to the latter is definitive truth is to the Idealist only the necessary result of our organisation. Nor is it enough merely to admit this. As soon as the idea comes to the front that this result of our organisation is the only thing about which we need concern ourselves, the standpoint still remains essentially Materialistic, unless we choose to invent a special name for this position, which, as is well known, is that recently taken up by Büchner. Genuine Idealism will always set up beside the phenomenal world also an ideal world, and will concede to it, even when it is regarded as a product of the brain, all those rights which follow from its relations to the needs of our intellectual life. It will therefore, too, always love to refer to those points in which is seen the impossibility of a Materialistic explanation of the whole essentiality of things. In Strauss we do not find either the positive or the critical principle of Idealism anywhere suggested, and the very way in which he speaks of Du Bois-Reymond's limits of knowledge shows clearly how decided is his Materialistic position.[31] With striking acuteness Strauss singles out all those points which show that Du Bois-Reymond, in thinking of the 'limits' of the knowledge of nature, cannot be proposing to throw a doubt on what is its very essence, namely, the consistent mechanical conception of the universe, or to allow antiquated dogmas to take up

[31] Comp. Postscript to the new ed. of D. Alte u. d. Neue Glaube, Bonn, 1873, S. 22 f., E.T., ii. 241.

their abode behind these limits. The true core, however, of the problem of the theory of knowledge Strauss discusses almost without understanding it, and as though it were matter of indifference. The absolute gulf between the motion of cerebral atoms and sensation is with Strauss, to say nothing of his doubting it, no reason for giving up his case; as soon, at least, as the causal connexion between the two sets of phenomena is made probable.[35] But this is precisely the standpoint of Materialism, which postpones the insoluble problem and holds fast to the closed circle of the causal law, in order from here to open its polemic against religion.

As with Ueberweg the collapse of his Aristotelian teleology, so with Strauss the deliverance from the fetters of the Hegelian philosophy, must almost necessarily lead to Materialism; for no modern philosophy had so thoroughly concealed the salient point of philosophical criticism and overgrown it with its fantastic notions, as Hegel had done with his doctrine of the identity of thought and existence. The whole mind of a true Hegelian was, as it were, schooled and exercised to pass over unsuspectingly the point where Materialism and Idealism separate. In Strauss this direction, or at least the beginning of it, set in soon after his great theological labours; it might, however, be difficult, and will be one of the functions of his biographer, which we may not here attempt, to exhibit this process in all its stadia.[36] His Materialistic testament, the treatise 'Der Alte und der Neue Glaube,' Leipzig, 1872, has all the appearance of a fruit ripened through many years, and there can be no question of any inclination of the writer to go on beyond this standpoint again.

[35] L.c., S. 28 f., E.T., p. 247: "Whether the master's assertion is really destined to be final, time, after all, only can decide; happily I can accept it meanwhile without therefore giving up my case for lost." Yet this is a matter with which the authority of no master has anything to do, and on which the judgment of every man who understands the question is equally valid.

[36] Meantime we have some points of support in Zeller's admirable book, 'David Friedrich Strauss in s. Leben u. s. Schriften geschildert,' Bonn, 1874. That this does not pretend to be a complete biography is set forth by the author himself, S. iv.

The little book, which made so great a sensation and called up so many antagonists, contains all that we need for our purpose. It is a result of his theological tendency that two chapters are prefixed in which the writer seeks to answer the pregnant questions, Are we still Christians? and, Have we still a Religion? Then follows the chapter, What is our Conception of the Universe? in which the author first makes his Materialistic confession of faith. The last chapter, What is our Rule of Life? leads us into the sphere of ethics, and gives us abundant opportunity to learn the writer's views on the state and society. We deal first with the two latter chapters, and will afterwards take a glance at the contents of the earlier ones.

The answer to the question, What is our Conception of the World? is a masterpiece as a concise and lively sketch of a complete cosmology. Without much polemic or unnecessary digression, Strauss allows his system to direct itself through the natural order of the exposition. Beginning from sense-impressions, he comes with swift but sure steps to our conception of the universe, whose infinity he expressly asserts. In his cosmogony he rests almost entirely upon Kant, having careful regard to the present state of the natural sciences. Like Ueberweg, he supposes that the original dispersion of matter must be regarded merely as the result of the collapse of earlier planetary systems. But while Ueberweg infers from this process, in connexion with Darwinism, a progress of the world to ever greater perfection, Strauss rather lays stress upon the eternity and essential uniformity of the infinite whole. In the universe, in its absolute sense, there are planetary systems continually cooling and perishing, and just as continually other systems forming themselves anew from the collapse. Life is eternal. If it disappears here, it is beginning there, and again at other points is in the full vigour of its strength. This everlasting process can, as Kant believed, as little have had a beginning as it can have an end; and thus vanishes, too, any ground for assuming a Creator.

In the able discussion of the question of the inhabit-

ability of other heavenly bodies which then follows, the limits, according to the conditions of nature known to us, should perhaps be drawn somewhat more strictly; but here too there are no serious objections to be taken. Keeping closely to the views now prevailing among specialists, Strauss briefly describes the epochs of the formation of the world, in order to dwell at greater length on the question of the origin and development of organic creatures, including man. Here Strauss everywhere follows the views of Darwin and the leading German Darwinians, and almost everywhere, where he had to choose between different ways, strikes with sure tact the most probable and natural. The whole section gives us the impression of a serious and appreciative study of these questions, of which only the final result of a careful and comprehensive examination is presented in an easy and agreeable form to the reader. Nowhere, therefore, do the polemics of his numerous opponents make a weaker impression than when they strive to convict Strauss of all kinds of scientific errors, and especially to represent his Darwinism as an unreflecting acceptance of scientific dogmas. Theological and philosophical opponents drag together out of the controversies of men of science material of the most doubtful kind in order to demolish Strauss with it, while every accurate student of this province easily gains the conviction that Strauss was quite familiar with these objections, but that, properly appreciating his object and the space that he could devote to these things, he saw no reason to mention and refute them.

Although, therefore, in details Strauss is almost everywhere right as against his opponents, yet it is only *correct Materialism* that he expounds, and all the weaknesses and inadequacies of this theory of things affect him in the same way as they affect modern Materialism generally. We shall find some examples of this farther on, and turn now to his ethical and political views.

Here we have quite another picture. Strauss moves on

the ground of scientific studies and penetrating reflexion only so far as he is concerned to obtain a general Naturalistic foundation of ethic, and even here hardly one definite principle is rigidly carried out. As soon, however, as he comes to political and social arrangements, we find a strong predominance of subjective impressions and views with little deep foundation.

Quite consistently Strauss begins by deducing the fundamental virtues from sociality and the needs of an ordered social life, and then adds the principle of sympathy. This seems to him, however, not sufficiently to explain the sphere of morality, and he springs from the Naturalistic principles to an Idealistic principle: in moral action man directs himself by the idea of species. How man comes to the idea of his species, how, further, he attains to a conception of the 'destiny' of humanity, is not examined; the succeeding expositions aim rather to develop objectively what man is and in what he finds his destiny. From this our duties are then deduced.

It is not worth while to follow this deduction in detail, but the results are of interest. Strauss shows himself everywhere more conservative than Ueberweg, and while the latter at least shows that he appreciates divergent views, Strauss is in this field as peremptory and dogmatic as he is short-sighted and superficial. It requires all the narrowness of German Philistine life of olden days to explain in some measure how a man of such acuteness could remain entangled in these views.

Strauss directs his sharpest attack against Socialism, and this with him, as with Ueberweg, is closely connected with his high appreciation of modern Industrialism, and with his severe condemnation of the hostility to labour shown in Christianity. Also Strauss mentions with sharp censure the hell-torments which befall the rich man, and the commandment to the wealthy young man to sell his goods and give the produce to the poor. "Christianity, in common with Buddhism, teaches a thorough cult of

poverty and mendicity. The mendicant monks of the Middle Ages, as well as the still flourishing mendicancy at Rome, are genuinely Christian institutions, which have only been restricted in Protestant countries by a culture proceeding from quite another source." Strauss adopts Buckle's eulogy of wealth, industrial activity, and the love of money, and adds the following remark: "It does not therefore follow that the love of acquisition should not, like every other impulse, be kept within reasonable bounds and subordinated to higher aims; but in the teaching of Jesus it is ignored from the very first, and its effectiveness in promoting culture and humanitarian tendencies is misunderstood, Christianity in this respect manifesting itself as a principle directly antagonistic to civilization. It only prolongs its existence among the enlightened and commercial nations of our time by the emendations which a cultivated but profane reason has made in it, this being at the same time so magnanimous as to impute them not to itself but to Christianity, to the spirit of which they are, on the contrary, entirely opposed."[37]

It need hardly be said that Strauss also rejects the principle of self-mortification, the fanatical asceticism, the contempt of the world, and other characteristic features of Christianity. His ethic, so far as we can gather it from his restless polemic against everything Christian, rests entirely on the idea that it is the destiny of man to order himself suitably in this world by labour and social order, and to strive by means of art and science to ennoble his existence, and to attain to more delicate intellectual enjoyments. The question, Are we still Christians? he answers then quite unreservedly, No; the question, however, Have we still religion? with a conditional Yes. It depends, that is to say, upon whether our feeling of dependence as regards the universe and its laws is to be regarded as religion or not. A cult we shall no longer build upon this feeling, but it still has a moral effect, and

[37] D. Alte u. d. Neue Glaube, 2 Aufl., S. 63, 64; E.T., i. 71-73.

is connected with a certain piety. We feel ourselves hurt if this piety is contemned, as it is, for instance, by Schopenhauer's pessimism. The individual cannot lift himself above the universe; the universe, so full of law, and life, and reason, is our highest idea; and every genuine philosophy is therefore necessarily optimistic.[38]

Of the religious worship of the Free Communities Strauss judges unfavourably; they proceed consistently enough indeed in giving up dogmatic tradition, and taking their stand on the ground of natural science and history, but this is no basis for a religious society. "I have attended several services of the Free Communities, and found them terribly dry and unedifying. I quite thirsted for an allusion to the Biblical legend or the Christian calendar, in order to get at least something for the heart and imagination, but the cordial was not forthcoming. No; this is not the way either. After the edifice of the Church has been demolished, to go and give a homily on the bare, pitifully levelled site, is dismal to a degree that makes one shudder." Strauss himself, then, would not enter into a 'Church of Reason' if the state should liberally endow it with all the rights of the old Church. He and his fellows can do without any Church. They edify themselves by keeping their minds open for all the higher interests of humanity, above all, for national life. They seek to sustain their national feeling by historical studies, and at the same time to increase their knowledge of nature; "and finally, in the writings of our great poets, in the performances of the works of our great musicians, we find a stimulus for the intellect and heart, for humour and imagination, which leaves nothing to be desired. 'Thus then we live, so find our happiness.'"

And we can do so. Our means allow it; for the 'we'

[38] L. c., S. 141–147, E.T., i. 161–168. It is worth while to remark here the shocking fallacy by which Strauss tries to refute pessimism (S. 145): If the world is bad, then the thought of the pessimist is bad also; if this is bad, then it follows that the world is good!

in whose name Strauss speaks are, according to his own enumeration, "not exclusively scholars or artists, but civil servants and military men, business men and landed proprietors." The people are only very lightly to be relied on. He has, moreover, our national poets, if for a time he cannot go to concerts. Lessing's 'Nathan' and Goethe's 'Hermann and Dorothea' also contain 'saving truths,' are, moreover, easier to understand than the Bible, which not even many theologians understand. Of the 'saving truths' which the people through tradition, from father to son, read into the Bible, and of the understanding of them which people suppose that they have, nothing further is said. They are errors, and therefore without justification for their existence; even though in these very traditional ideas there lies the highest value that the Bible can have for the woe-begone heart of the poor and feeble. When the schools waste less time over Jewish history, then our great poets will have a better chance of being generally understood. But from whence, in our present excellent political state, the impulse is to come for so eventful a change, is not discussed. Nor is it, in fact, necessary; for the proper consequence of this whole standpoint is at bottom this: the people may remain where they happen to be, thanks to the sacred laws of the universe, if only 'we,' the cultured and propertied, can at last free ourselves from the burden of appearing and being called Christians, though we are no longer so.

A detailed criticism of this standpoint[39] will hardly be necessary after what has been already said; besides, our next and final chapter will once more clearly exhibit our

[39] It may here be just mentioned in passing that even the Straussian minimum of religion still has its unproved dogmas and its principles which on ethical grounds go beyond reality. Unproved and unprovable especially is the infinity of the world. Optimism, moreover, is a pious error, for this, as well as its opposite, Pessimism, is only a product of human ideology. The world of reality is in itself neither good nor bad.

attitude towards these questions. It is, however, no mere accident that two so highly gifted and noble men, and yet two such entirely different natures as Strauss and Ueberweg, combine with their Materialism the justification of modern Industrialism, and that for the religion of the wretched and oppressed they substitute a religion of the privileged aristocracy, which refuses all churchly community with the great masses. A current of Materialism runs through our modern civilisation, which carries away with it every one who has not somewhere found "firmer anchorage." Philosophers and economists, statesmen and business men, agree in praising the present and its achievements. With the praise of the present is combined the cult of actuality. The ideal has no quotation on our exchanges; what cannot scientifically and historically show its legitimacy is condemned to perish, even though a thousand joys and refreshments for the people depend upon it, for which we no longer care.

In his 'Postscript as Preface,' Strauss points out that by his combination of Materialism with conservative political principles he had lost the favour of all parties. In this he forgot only his own army, the 'we' in whose name he speaks. After reading this passage in his postscript, I laid the book down a moment, and turned over the leaves of an illustrated paper that happened to lie upon the table. My first glance fell on the caricature of a 'Communist;' my second on a picture of Feuerbach's study, with a biographical sketch of Feuerbach, which knew no end to his praises. The editors of these papers know very well what the public likes, and it seems very much as if their public is very decidedly related to the society in whose name Strauss has spoken his confession.

But the Socialists also favour Materialism. This is by no means inconsistent with the remark that we have made. Socialists and worshippers of existing social conditions agree in this, that they reject the reference of

religion to the future, and find the happiness of humanity in this present life. Besides, the leaders of the Socialists, who give the cue in this respect, are for the most part men of education, who, at all events in Germany, have been trained in Feuerbach's ideas. The great mass of their followers are tolerably indifferent in this respect. Driven by the consciousness of their necessities, they throw themselves into the arms of him who promises them a decided improvement, or even a decided struggle and prospect of revenge, whether in other respects he favours Papal infallibility or Atheism. For many years Socialism has learnt to hate the Church as the partner of the State; but as soon as serious difference occurs between the Church and the State, a portion of the Socialists—very imprudently but very naturally—begin to coquette with the Church. Revolution is with the extreme leaders of this party their only aim, and it is in the nature of circumstances that only extreme leaders are possible, because only extreme tendencies move the masses. Should Socialism ever attain this immediate but purely negative aim, and then, amidst general confusion, have to give shape to its ideas, the cool sway of abstract understanding will hardly maintain its predominance. If it comes to the dissolution of our present civilisation, it will hardly be that any existing Church, and still less Materialism, will succeed to the inheritance, but from some unsuspected corner will emerge some utter absurdity, like the Book of Mormon or Spiritualism, with which the justified ideas of the epoch will fuse themselves, to found a new centre of universal thought, to last perhaps for thousands of years.

There is but one means to meet the alternative of this revolution or of a dim stagnation; but this means does not consist, as Strauss thinks, in the cannon which are to be directed against Socialists and Democrats, but solely and entirely in the timely surmounting of Mate-

rialism, and in the healing of the breach in our popular life which is produced by the separation of the educated from the people and its spiritual needs. *Ideas* and *sacrifices* may yet save our civilisation, and transform the path that leads through desolating revolution into a path of beneficent reforms.

CHAPTER IV.

THE STANDPOINT OF THE IDEAL.

MATERIALISM is the first, the lowest, but also comparatively the firmest stage in philosophy. Starting immediately from natural knowledge, it becomes a system by looking beyond the limits of this knowledge. The necessity that rules in the sphere of the natural sciences lends to the system which is most immediately based upon them a considerable degree of the uniformity and certainty of its separate parts. A reflexion of this certainty and necessity falls also upon the system as such, but this reflexion is deceptive. Precisely what makes Materialism a system, the fundamental hypothesis which elevates the particular branches of natural knowledge by a common bond into a whole, is not only its most uncertain part, but is, in fact, untenable before a deeper-going criticism. But exactly the same relation is repeated in the particular sciences upon which Materialism is based, and therefore, too, in all the separate parts of the system. The certainty of these parts is, rightly considered, nothing but the certainty of the facts of the science, and this is always greatest for the immediately given particular. The unity which makes the facts into a science and the sciences into a system is a product of free synthesis, and springs therefore from the same source as the creation of the ideal. While, however, this deals quite freely with the materials, synthesis in the province of science has only the freedom of its origin from the speculative mind of man. It is, on

the other hand, tied to the task of establishing the utmost possible harmony between the necessary factors of knowledge, which are independent of our will. As the artisan, in the case of an invention, is tied to its purpose, while at the same time the idea of it springs freely from his mind, so every true scientific induction is at once the accomplishment of a given task and a product of the speculative mind.

Materialism more than any other system keeps to reality, *i.e.*, to the sum total of the necessary phenomena given to us by the compulsion of sense. But a reality such as man imagines to himself, and as he yearns after when this imagination is dispelled, an existence absolutely fixed and independent of us while it is yet known by us—such a reality does not exist and cannot exist, because the synthetic creative factor of our knowledge extends, in fact, into the very first sense-impressions and even into the elements of logic.[40] The world is not only *idea*, but also our *idea;* a product of the organisation of the *species* in the universal and necessary characteristics of all experience; of the *individual* in the synthesis that deals freely with the object. We may also say that the reality is the phenomenon for the species, while the delusive appearance, on the contrary, is a phenomenon for the individual, which only becomes an error by reality, *i.e.*, existence for the species, being ascribed to it.

But the task of producing harmony among phenomena and of linking the manifold that is given to us into unity belongs not merely to the synthetic factors of experience,

[40] That to the principle A = A strictly understood reality nowhere corresponds, A. Spir has recently energetically insisted on and made it the basis of a philosophical system of his own. All the difficulties involved in this fact may, however, be much more easily disposed of in another way. The principle A = A is indeed the basis of all knowledge, yet is not itself knowledge, but an act of the mind, an act of primitive synthesis by which there is posited as the necessary starting-point of all thinking an equality or a persistence which are found in nature only relatively and approximately, but never absolutely and completely. The principle A = A accordingly indicates at the very threshold of logic the relativity and ideality of all our knowledge.

but also to those of speculation. Here, however, the connecting organisation of the species leaves us in the lurch: the individual speculates in his own fashion, and the product of this speculation acquires importance for the species, or rather for the nation and contemporaries, only in so far as the individual creating it is endowed with rich and normal talents and is typical in his modes of thought, while by his intellectual energy he is called to be a leader.

The conceptional poesy of speculation is, however, not even so completely free; it still strives, like empirical research, after a unitary exhibition of data in their connexion, but it lacks the guiding compulsion of the principles of experience. Only in poesy, in the narrower sense of the word, in poetry, is the ground of reality consciously abandoned. In speculation form has the preponderance over matter; in poetry it is completely dominant. The poet creates in the free play of his spirit a world to his own liking, in order to impress more vividly upon the easily manageable material a form which has its own intrinsic value and its importance independently of the problems of knowledge.

From the lowest stages of synthesis, in which the individual still appears completely bound by the characteristics of the species, up to its creative dominance in poetry, the essence of this act is always directed to the production of unity, of harmony, of perfect form. The same principle which rules absolutely in the sphere of the beautiful, in art and poetry, appears in the sphere of conduct as the true ethical norm which underlies all the other principles of morality, and in the sphere of knowledge as the shaping, form-giving factor in our picture of the world.

Although, therefore, the very picture of the world which the senses give us is involuntarily formed upon the ideal within us, yet the whole world of reality, as compared with the free creations of art, appears inharmonious and full of perversities. Here lies the source of all Optimism and

Pessimism. Without comparison we should not be able to form a judgment as to the quality of the world. But when from some elevated point we regard a landscape our whole nature is attuned to ascribe to it beauty and perfection. We must first destroy the powerful unity of this picture by analysis, in order to remember that in those huts, peacefully resting on the mountain slope, there dwell careworn men; that behind that little sheltered window perhaps some sufferer is enduring the most terrible torments; that beneath the murmuring summits of the distant forest birds of prey are rending their quivering prey; that in the silvery waves of the river a thousand tiny creatures, scarcely born to life, are finding a cruel death. To our sweeping glance the withered branches of the trees, the blighted cornfields, the sun-scorched meadows, are only shadows in a picture which delights our eye and cheers our heart.

Thus the world appears to the optimistic philosopher. He praises the harmony which he himself has introduced into it. As compared with him, the Pessimist a thousand times is right; and yet there could be no Pessimism at all without the natural ideal of the world which we carry within us. It is only contrast with this that makes reality bad.

The more freely synthesis exerts its function, the more æsthetic becomes the image of the world, the more ethical is its reaction upon our activity in the world. Not only poetry, but speculation too, however it may appear to be directed to knowledge only, has essentially æsthetic, and, through the attractive force of the beautiful, also ethical intent. In this sense we might indeed say, with Strauss, that every genuine philosophy is necessarily optimistic. But philosophy is more than mere imaginative speculation; it embraces also logic, criticism, the theory of knowledge.

We may call those functions of the senses and of the combining intelligence, which produce reality in us, individually low as compared with the lofty flight of the

spirit in freely creative art; but as a whole, and in their combination, they may not be subordinated to any other mental activity. Little as our reality may be a reality after our own hearts, it is nevertheless the firm basis of our whole intellectual existence. The individual grows up from the soil of the species, and general and necessary knowledge forms the only safe basis for the elevation of the individual to an æsthetic apprehension of the world. If this basis is disregarded, speculation too can no longer be typical, no longer be full of significance; it loses itself in fantasies, in subjective caprice and puerile frivolity. But, above all, is the most genuine possible conception of reality the whole basis of daily life, the necessary condition of human intercourse. The community of the species in knowledge is at the same time the law of all interchange of ideas. But it is even more than this: it is also the only way to the mastery of nature and its forces.

However much the modifying influence of the psychical synthesis reaches down to our most elementary ideas of things, of an object, yet we have the conviction that something lies at the bottom of these ideas and of the world arising from them that does not spring from ourselves. This conviction rests essentially upon the fact that we discover between things not merely a *connexion*, which might indeed be just the plan upon which we have conceived them, but also a *co-operation*, which goes on irrespective of our thought, and which acts upon us ourselves and subjects us to its laws. This strange element, this 'non-ego,' of course only becomes again 'object' for our thought by being conceived by each individual in the universal and necessary forms of knowledge of the species; yet it does not therefore consist merely of these forms of knowledge. We have before us in the laws of nature not merely laws of our knowledge, but also evidences of *something else*, of a power that now compels us and now is dominated by us. In our com-

merce with this power we are exclusively dependent upon experience and upon reality, and no speculation has ever found the means of penetrating by the magic of pure thought into the world of things.

The method, however, which leads equally to the knowledge and to the mastery of nature, demands nothing less than a continual disintegration of the synthetical forms under which the world appears to us, so as to eliminate every subjective element. Withal indeed the new knowledge that better harmonised with the facts could in its turn only attain to form and stability by means of synthesis; but science found itself driven to simpler and ever simpler views, until at last it had to halt at the principles of the mechanical theory of the world.

Every falsification of reality attacks the bases of our spiritual existence. As opposed to metaphysical imaginations, which make pretensions to penetrate into the essence of nature and to determine from pure notions what only experience can teach us, Materialism as a counterpoise is therefore a real benefit. Moreover, all philosophemes which tend to regard reality alone must necessarily gravitate towards Materialism. On the other hand, Materialism lacks relations to the highest functions of the free human spirit. It is, apart from its theoretical inadequacy, unstimulating, barren for science and art, indifferent or inclined to egoism in the relations of man to man. It can hardly close the circle of its system without borrowing from Idealism.

If we observe how Strauss decks out his universe that he may be able to adore it, the thought presents itself that in truth he is not so very far removed from Deism. It seems almost a matter of taste whether we adore the masculine 'God,' the feminine 'Nature,' or the neuter 'All.' The sentiments are the same, and even the mode in which we conceive the object of these sentiments offers no essential difference. In theory, indeed, 'God' is no longer personal; and in the rapt elevation of the soul even the 'All' is treated as a person.

Natural science cannot lead to this. All natural science is analytical and clings to the particular. The particular discovery delights us; method compels our admiration, and by the continual succession of discoveries our glance is perhaps conducted to an infinite perspective of ever more perfect insight. Yet with this we are already quitting the ground of strict science. For the universe, as mere natural science enables us to comprehend it, we can as little feel enthusiasm as for an 'Iliad' spelt out letter by letter. But if we embrace the whole as a unity, then in the act of synthesis we bring our own nature into the object, just as we shape the landscape that we gaze at into harmony, however much disharmony in particulars may be concealed by it. All comprehension follows æsthetic principles, and every step towards the whole is a step towards the Ideal.

Pessimism, which likewise clings to the whole, is a product of reflexion. The thousand contrarieties of life, the cold cruelty of nature, the pains and imperfections of all creatures, are collected in their individual features, and the sum of these observations is contrasted with the ideal picture of Optimism as a terrible indictment of the universe. A complete picture of the universe, however, is not reached in this way. Only the Optimist picture of the world is destroyed, and this involves a great service, if Optimism is inclined to become dogmatic and to pass itself as the representative of truth and reality. All those beautiful ideas of the individual disharmony which is resolved into the harmony of the great whole, of higher, divine contemplation of the world, in which all riddles are solved and all difficulties disappear, are successfully destroyed by Pessimism; but this destruction affects the dogma only, not the ideal. It cannot do away with the fact that our mind is so constituted as ever anew to produce within itself a harmonious picture of the world; that here as everywhere it places its ideal beside and above the reality, and recreates itself from the struggles

and necessities of life by rising in thought to a world of all perfections.

This ideal effort of the human spirit acquires now fresh strength through the knowledge, that our reality also is no absolute reality, but appearance; for the individual conclusive and corrective of his casual combinations, in the species a necessary product of its disposition in co-operation with unknown factors. These unknown factors we conceive to ourselves as things which exist independently of us, and which, therefore, would possess that absolute reality which we have just declared to be impossible. But the impossibility remains; for even in the notion of the thing, that stands out as a unity from the infinite coherency of existence, there lies that subjective factor which, as a constituent part of our human reality, is quite in place, but beyond it only helps to fill up, on the analogy of our reality, the gap for that which is absolutely inconceivable, but which must at the same time be assumed.

Kant has abandoned metaphysical inquiry into the true bases of all existence because of the impossibility of a certain result, and has limited the task of metaphysic to the discovery of all *a priori* given elements of experience. It is, however, questionable whether this new task is not equally impracticable; and it is no less questionable whether man, on the strength of the natural impulse to metaphysic which Kant himself maintains, will not continually make fresh efforts to break through the barriers of experience, and to build up into empty air brilliant systems of a supposed knowledge of the absolute nature of things. The sophisms by which this is possible are indeed inexhaustible; and while sophisms cunningly elude the position of criticism, a splendid ignorance easily breaks through all barriers with a still more brilliant success.

One thing is certain, that man needs to supplement reality by an ideal world of his own creation, and that the highest and noblest functions of his mind co-operate in such creations. But must this act of intellectual freedom always

keep on assuming the deceptive form of a demonstrative science? In that case Materialism, too, will always reappear, and will destroy the bolder speculations with an attempt to satisfy the instinct of the reason towards unity by a minimum of exaltation above the real and demonstrable.

We may not doubt of another solution of the problem, especially in Germany, since we have in the philosophical poems of Schiller a performance which unites with the noblest vigour of thought the highest elevation above reality, and which lends to the ideal an overpowering force by removing it openly and unhesitatingly into the realm of fantasy. This must not be taken to mean that all speculation must also assume the form of poetry. Schiller's philosophical poems are more than mere products of the speculative instinct. They are emanations of a truly religious elevation of the soul to the pure and troubled sources of all that man has ever worshipped as divine and supermundane. May Metaphysic ever continue its efforts towards the solution of its insoluble problem! The more it continues theoretical, and tries to compete in certainty with sciences of reality, all the less will it succeed in obtaining general importance. The more, on the other hand, it brings the world of existence into connexion with the world of values, and tries to raise itself by its apprehension of phenomena to an ethical influence, the more will it make form predominate over matter, and, without doing violence to the facts, will erect in the architecture of its ideas a temple of worship to the eternal and divine. Free poetry, however, may entirely leave the ground of reality and make use of myth in order to lend words to the unutterable.

Here then we stand too before an entirely satisfactory solution of the question as to the immediate and more distant future of religion. There are only two ways which can permanently call for serious consideration, after it has been shown that mere Rationalism loses itself in the

sands of superficiality, without ever freeing itself from untenable dogmas. The one way is the complete suppression and abolition of all religions, and the transference of their functions to the State, Science, and Art; the other is to penetrate to the core of religion, and to overcome all fanaticism and superstition by conscious elevation above reality and definitive renunciation of the falsification of reality by mythus, which, of course, can render no service to knowledge.

The first of these ways involves the danger of spiritual impoverishment; the second has to deal with the great question whether, at this very time, the core of religion is not undergoing a change which makes it difficult to apprehend it with certainty. But the second difficulty is the lesser one, because the very principle of the spiritualisation of religion must facilitate and lend a more harmonious form to every transition rendered necessary by the intellectual requirements of a progressive age.

There is the additional difficulty, whether the abolition of all religion, however desirable it may appear to many well-meaning and thinking men, is at all possible. No reasonable man will entertain the notion of a sudden or even violent step. He will rather descry in this principle primarily a maxim for the attitude of the more highly cultured, somewhat in the sense of Strauss, whose residuum of religion is here little concerned. But next an effort will be made to employ the State and the School in order gradually to withdraw the ground from under religion in the life of the people, and systematically to prepare the way for its disappearance. If we suppose such a course of proceeding, it would be very doubtful whether it would not necessarily produce, in spite of scholastic enlightenment, a popular reaction in favour of a thoroughly fanatical and narrow-minded conception of religion, or whether ever fresh, perhaps wild, but at the same time vigorous, shoots would not spring up from the roots that had been left behind. Man seeks the truth of

reality and hails the extension of his knowledge so long as he feels himself free. But let him be chained down to what can be attained by the senses and the understanding, and he will revolt, and will give expression to the freedom of his imagination and his spirit, perhaps, in still cruder forms than those which have been successfully destroyed.

So long as men sought the core of religion in certain doctrines on God, the Human Soul, the Creation and its Order, it was inevitable that every criticism which began by separating upon logical principles the chaff from the wheat must end in complete negation. The sifting process went on till nothing was left.

If, on the other hand, we descry the core of religion in the elevation of our souls above the real and in the creation of a home of the spirit, then the purest forms may produce essentially the same psychical processes as the charcoal-burner's creed of the uncultured masses, and all the philosophical refinement of ideas will never bring us to zero. An unrivalled model of this is the way in which Schiller, in his 'Realm of Shadows,' has generalised the Christian doctrine of redemption into the idea of an æsthetical redemption. The elevation of the soul in faith here becomes the flight into the idea-land of beauty, where all labour finds its rest, every struggle and every want their peace and their reconciliation. But the heart which is terrified by the awful power of the law which no mortal can resist, opens itself to the divine will, which it recognises as the true essence of its own will, and thus finds itself reconciled with Deity. If these moments of elevation are but fleeting, yet they work with freeing and purifying effect upon the soul, and in the distance appears the perfection which no one can any more deprive us of, figured under the image of Herakles mounting to the skies.

This poem is a product of a time and a sphere of culture which were certainly not inclined to concede too much to what was specifically Christian; the poet of the

Gods of Greece' does not conceal himself; everything here is in a sense pagan; and yet Schiller here stands nearer to the traditional life of Christian faith than the rationalising dogmatism which arbitrarily maintains the notion of God, and abandons the doctrine of redemption as irrational.

Let us accustom ourselves, then, to attribute a higher worth than hitherto to the principle of the creative idea in itself, and apart from any correspondence with historical and scientific knowledge, but also without any falsification of them; let us accustom ourselves to regard the world of ideas, as figurative representation of the entire truth, as just as indispensable to all human progress as the knowledge of the understanding, by resolving the greater or less import of every idea into ethical and æsthetic principles. This advice will indeed appear to many an old or even new believer, as if we were to draw the ground from beneath his feet and ask him to remain standing as though nothing had happened; but the question is, what is the ground of ideas, whether it is their ordering into the whole of the world of ideas on ethical considerations, or the relation of the conceptions in which the idea finds expression to empirical reality? When the revolution of the earth was demonstrated, every Philistine believed that he must fall unless this dangerous doctrine were refuted much as nowadays many a man fears that he will become a barber's block, if Vogt can prove to him that he has no soul. If religion is worth anything, and if its lasting worth lies in its ethical, and not in its logical content, this must, of course, have been so earlier also, however much we might like to regard literal belief also as indispensable.

If this state of affairs had not been clearly present in the consciousness of the wise, and at least dimly in the consciousness of the people also, how could the poet and the sculptor in Greece and Rome have ventured to shape the course of the living myth and to give new forms to the ideal of deity? Even Catholicism, rigid

as it appears, handled dogma at bottom only as a powerful clamp to hold together in its unity the gigantic fabric of the Church, while the poet in legend, the philosopher in the profound and daring speculations of Scholasticism, dealt as they pleased with the material of religion. Never indeed, never since the beginning of the world, has a religious dogma been held by people who could rise above the standpoint of the rudest superstition as true in the same manner as a piece of sensible knowledge, a result of calculation or of a simple inference of the understanding, even though perhaps never down to the latest times has there prevailed entire clearness as to the relation of these 'eternal truths' to the invariable functions of the senses and the understanding. We can always with the most orthodox zealots, discover in their sayings and writings the point where they obviously pass into symbol, and reproduce the plastic representation of a subjective development of the religious idea, with the same expressions and the same emphasis, with which they can so sensuously and concretely exhibit the relatively objective doctrines, that are admitted by a wide community, and are regarded by individuals as inexpugnable. If these truths of the universal doctrine of the Church are prized as 'higher,' and put above all other knowledge, even that of the multiplication-table, yet there is always present at least a suspicion that this superiority does not rest upon greater *certainty*, but upon a greater *value*, against which neither logic, nor touch of the hand, nor sight of the eye, can avail, because for it the idea, as form and essence of the constitution of the soul, may be a more powerful object of longing, than the most real matter. But even where the greater certainty, the higher sureness and trustworthiness of religious truths are vaunted in express terms, these are only the periphrastic expressions or confusions of an exalted mind for the stronger impulse of the heart towards the living source of edification, of strengthening, of fresh life, which flows

down from the divine world of ideas, as compared with the sober knowledge which enriches the understanding with small change, for which we happen to have no employment. Carried away to the height of this spiritual condition, Luther, though he himself, by the destructive force of his conviction, threw down an edifice that had stood a thousand years, rises to the point of cursing the reason that opposes itself to what he with all the might of his glowing spirit has conceived as the idea of a new epoch. Hence, too, the value which really pious minds have always given to inward *experience* as an evidence of faith. Many of these believers, who owe their peace of soul to a fervent wrestling in prayer, and hold spiritual communion with Christ as with a person, know theoretically very well that the same emotional processes are found also with the same success and with the same authenticity in connexion with entirely different articles of faith, nay, among the adherents of entirely foreign religions. The opposition to these and the equivocal character of an evidence which equally well supports contradictory ideas, they do not as a rule realise, since it is rather the common opposition of every belief against unbelief that stirs their minds. Does it not here become manifest that the essence of the thing lies in the form of the spiritual process, and not in the logical and historical content of the particular views and doctrines? These may well be connected with the form of the process, as are in the corporeal world chemical composition and crystalline form; but who is there to demonstrate to us this connexion, and what phenomena of isomorphism shall we only here find exhibited?

This predominance of the form in belief betrays itself also in the remarkable trait that the believers in varying and even mutually hostile confessions, show more agreement with each other, betray more sympathy with their most eager opponents, than with those who appear indifferent in matters of religious controversy. The most

peculiar phenomenon of religious formalism, however, lies in the *philosophy of religion*, as it has shaped itself in Germany, especially since Kant. This philosophy is a formal translation of religious into metaphysical doctrines. A man, who was so far removed from the charcoal-burner faith in regard to unhistorical traditions and scientific impossibilities as the Materialists could ever be, Schleiermacher, brought about, by dwelling on the ethical and ideal content of religion, a real torrent of religious revival. The mighty Fichte announced the dawn of a new historical epoch by the outpouring of the Holy Spirit upon all flesh. The Spirit, of which it is prophesied in the New Testament that it shall lead the disciples of Christ into all truth, is no other than the Spirit of Science, which has revealed itself in our days. It teaches us in revealed knowledge the absolute unity of human existence with the divine, which was first preached to the world by Christ in a parable. The revelation of the kingdom of God is the essence of Christianity, and this kingdom is the kingdom of liberty, which is won by the absorption of our own will into the will of God—death and resurrection. All doctrines of the resurrection of the dead in the physical sense are only misunderstandings of the doctrine of the kingdom of heaven, which is in truth the principle of a new constitution of the world. Fichte was entirely in earnest with his requirement of a transformation of the human race by the principle of humanity itself in its ideal perfection as opposed to the absorption of the individual in self-will. Thus the most radical philosopher of Germany is at the same time the man whose feelings and thoughts form the profoundest contrast to the interest-maxims of political economy and to the whole dogmatic theory of Egoism. It is not, therefore, without significance that Fichte was the first in Germany to raise the Social Question, which would, indeed, never exist if self-interest were the only spring of human actions, if the, abstractly

considered, perfectly correct rules of political economy, as the only ruling laws of nature, everlastingly and invariably guided the machinery of human toils and struggles, without the higher idea ever asserting itself, for which the noblest of mankind have for thousands of years suffered and wrestled.

"No, abandon us not, sacred palladium of mankind! comforting thought, that from our every labour and our every suffering there results for our brother-men a new perfection and a new delight; that we labour for them and do not labour in vain; that on the spot where we now exhaust ourselves and are trodden underfoot, and—what is worse than this—grossly err and fail, there will in the future flourish a race that may always do what it wills, because it will will nothing but what is good; while we from loftier regions rejoice over our descendants, and find developed in their virtues each germ that we implanted in them, and know them for our own. Arouse us, prospect of this time, to the sense of our dignity, and show it to us at least in our disposition, though our present state is at variance with it. Shed boldness and high enthusiasm upon our undertakings, and if we are crushed beneath them, while we are sustained by this thought, 'I have done my duty,' let us be invigorated by this other thought, 'No seed that I have sowed is lost in the moral world; in the day of ingathering I shall see its fruits and weave me from them immortal garlands.'"[41]

The poetical fervour with which Fichte wrote these words had seized him not on occasion of a vague religious contemplation, but in regard to Kant and—the French Revolution. So intimately fused with him were life and teaching; and while the word of life was perverted by the hirelings of the Church to the service of death, of ignorance, of the prince of this world, there arose in him the spirit of the breaker of all chains, and

[41] (J. G. Fichte's) Beitrag zur Berichtigung der Urtheile des Publikums über die französische Revolution, 1793, 1 B., 1 Kap.

loudly confessed that the fall of society in France had at least brought forth something better than the despotic governments whose aim is the degradation of mankind.

It is remarkable how, on a closer inquiry, the views and efforts of men often group themselves very differently from the common notion of them. It is a trivial saying that extremes meet; but it is far from being always true. Never, never will the decided free-thinker feel any sympathy with rigid ecclesiasticism and the dead worship of the letter; but he may feel much with the prophetic enthusiasm of a pious soul, in which the word has become flesh, and which bears witness of the spirit that has taken possession of it. Never will the enlightened dogmatist of Egoism feel sympathy with the quiet souls who in their humble closets seek upon their knees a kingdom that is not of this world; but he may well feel it with the rich rector who can valiantly defend his creed, maintain his dignity, and prudently manage his property, and who drinks with him in champagne, if he sits near him at some luxurious christening dinner, or at the festive inauguration of a new railway.

Because it is the form of spiritual life that determines the inmost character of the man, so too their attitude to those who differ from them is a genuine touchstone of minds, whether they be of the truth or not. He must be a bad disciple of Christ, in the strictest sense of the religious, who cannot conceive that when the Lord appears in the clouds to judge the quick and the dead, He may place an Atheist like Fichte on His right hand, while thousands go to His left who cry, with the righteous, 'Lord, Lord!' He must be a bad friend of truth and justice who despises a man like A. H. Franke as an enthusiast, or treats the prayer of a Luther as idle self-delusion. In fact, so far as religion in its inmost essence forms an antithesis to Ethical Materialism, it will always retain friends amongst the freest and most enlightened minds, and the only question is whether in religion itself

the principle of Ethical Materialism, of 'secularisation,' as theologians call it, is not gaining such ascendancy that our better consciousness must tear itself free of all its previous forms and strike out new paths. In this point, in the relation of existing religions to the collective aims of our present civilisation, lies the true secret of their modifications and their persistence, and all attacks of the critical understanding, however justified and irresistible they may be, are yet not so much the cause as rather only the symptoms of their decay, or of a great fermentation in the whole spiritual life of their adherents. Hence it is, also, that even the conservative tendency which religious philosophy took with Hegel, accompanied by very similar modifications to those of Fichte, has borne no lasting fruits, either for the Church or for Philosophy. It can no longer be permitted that knowledge of the unveiled truth should be reserved for the philosophers alone, while the masses are forced back into the solemn twilight of the old symbols. As in politics the doctrine of the reasonableness of the actual state of things has done unholy service to the cause of Absolutism, so Philosophy contributed, chiefly through Hegel and Schleiermacher, to promote a tendency which, deserted by the naïve innocence of the old mysticism, attempted to save religion by a negation of negation. What protected the dogmas of religion against the teeth of criticism in the ages when the cathedrals grew up, or when the mighty melodies of worship arose, was not the anti-criticism of ingenious apologists, but the reverent awe with which the soul received the mysteries, and the holy fear with which the believer shrunk from approaching in his inmost soul the border where truth and poesy separate. This holy fear is not the *consequence* of the fallacies which lead to the belief in the supernatural, but rather their *cause*, and perhaps this relation of cause and effect runs back to the earliest ages of undeveloped civilisation and undeveloped religions. Why, even Epikuros, besides fear, regarded the

sublime dream-images of the gods as amongst the sources of religion!

What will become of the 'verities' of religion when all piety has disappeared, and when a generation grows up that has never known the deep emotions of religious life, or that has grown weary of them and has turned away from them? Every young fool triumphs over its mysteries, and looks down with self-complacent disdain on those who can still believe this silly stuff. So long as religion stands in its full strength, it is not always its most paradoxical principles that are the first to be doubted. Theological critics exert themselves by the application of the greatest acuteness and the most extensive erudition to correct tradition in some point or other far enough removed from the core of faith; men of science find reason to refer some particular miracle to a physically intelligible phenomenon. At such points the process of boring is continued, and when all the arts of attack and defence have been exhausted, as a rule the nimbus of venerableness and inviolability that enwrapped religious tradition is gone also. Only then do we come to the much simpler questions: How God's omnipotence and goodness are compatible with the evil in the world; why the religions of other peoples are not just as good as our own; why there are not still miracles, and those very palpable ones; how God can be angry; why the servants of God are so malicious and vindictive, and so on. When ecclesiastical tradition has at length lost the special credit which it claims, and when the Bible is regarded with the same eyes as any other book, we can hardly conceive any degree of intelligence so low as not to see clearly that three times one cannot make one, that a virgin cannot bear a child, and that a man cannot, body and all, soar up into the blue sky. If now some little scientific knowledge is added, such as is current in every primary school, there is no end to the absurdity over which a scoffer can make merry, without in any

degree possessing any special intelligence or any thorough education. If now, withal, men of keen understanding and solid education still hold fast to religion, because they have led from childhood up a rich emotional life, and cling to the old, familiar soil with a thousand roots of imagination, of the heart, and of recollection of beautiful and consecrated hours, we have then before us a contrast that shows us plainly enough where are the sources from which flows the stream of religious life.

So long, of course, as religion is cultivated in close ecclesiastical communities by priests who present themselves before the people as privileged dispensers of the divine mysteries, so long the standpoint of the ideal in religion will never be able to assert itself clearly. And, indeed, ideology only too easily becomes the prey of the poison of letter-worship, The symbol involuntarily and gradually becomes a rigid dogma, as the image of the saint becomes an idol, and the natural contradiction between poetry and reason easily degenerates in the religious sphere into antipathy to the absolutely True, Useful, and Practical, which in our age seem to limit on every side the space in which a free soul may use its wings. We know the mischief that has been wrought in many a nobly disposed mind by the transition from crude ideology to romantic perversity, and finally into angry pessimism. No one can take it ill of the friends of truth and progress, if they feel distrust of everything that opposes itself to the ruling tendency of the age towards prose, especially if a tincture of clericalism is visible. For if in the age of the Liberation Wars Romanticism seemed to fulfil its higher purpose, it is obvious, on the other hand, that the tendency of the age towards inventions, discoveries, political and social improvements, has now to perform enormous tasks which may perchance decide the future of humanity, and it cannot be doubted that the utmost sobriety of serious labour, the full unadulterated feeling for truth of a critical conscience, are needed to accomplish these tasks

worthily and successfully. When then the day of harvest comes, the glance of genius will again be there also, which from the atoms creates a whole without knowing how it has been done.

Meanwhile the old forms of religion have by no means entirely outlived themselves, and it will hardly ever come to be with their ideal content as with a squeezed lemon, until new forms of Ethical Idealism appear. Things do not go on so simply and unmixedly in the interchange of earthly opinions and aspirations. The worship of Apollo and Jupiter had not yet lost all significance as Christianity broke in, and Catholicism still held a rich treasure of life and spirit within it when Luther began to strike about him. So even to-day again a new religious community might, by the power of its ideas and the charm of its social principles, conquer a world by storm, while still many a stock of the old planting remains in full vitality and bears its fruit; but mere negation recoils where ends the province of the obsolete and dead, that has become its prey. Whether even out of the old confessions such a stream of new life might proceed, or whether conversely a religionless community could kindle a fire of such devouring force, we do not know. One thing, however, is certain; if the New is to come into existence and the Old is to disappear, two great things must combine—a world-kindling ethical idea and a social influence which is powerful enough to lift the depressed masses a great step forward. Sober reason, artificial systems, cannot do this. The victory over disintegrating egoism and the deadly chilliness of the heart will only be won by a great ideal, which appears amidst the wondering peoples as a "stranger from another world," and by demanding the impossible unhinges the reality.

So long as this victory is not won, so long as no new social bond makes the poor and miserable feel that he is a man among men, we must not be so precipitate in combating belief, lest haply child and bath be poured away

together. Let knowledge be spread, let truth be proclaimed in every street and in every tongue, let come of it what may; but let the battle for emancipation, deliberate and mortal battle, be directed against the points where the menacing of liberty, the hindering of truth and justice have their roots—against the secular and civil institutions by which ecclesiastical societies secure a corrupting influence, and against the enslaving power of a perfidious hierarchy that systematically undermines the freedom of the peoples. If these institutions are removed, if the terrorism of the hierarchy is broken, then the extremest opinions may move side by side without fanatical encroachments, and without the steady progress of insight being hindered. It is true that this progress will destroy superstitious fears, a work which is indeed in great part already accomplished even amongst the lowest classes of the people. If religion falls together with the superstitious fears, so let it fall; if it does not fall, then its ideal content will have maintained itself, and it may then continue to be maintained in this form until time produces something new. It is not then matter of any regret if the content of religion is regarded by most believers, and even by a part of the clergy, as literally true; for that utterly dead and meaningless belief in the letter, whose effect is even more pernicious, is hardly possible any longer where all compulsion disappears.

If the clergyman, as a result of the associations of ideas which dominate him, *cannot* represent the ideal element of life which he represents otherwise than in attributing to it vulgar reality and in taking everything as historical that should only be regarded as symbolical, this must be conceded to him without hesitation, supposing that he does his duty in the more important regard. If the hierarchy is entirely deprived of all worldly power, not excepting even the rights of a civil corporation, and if the formation of a state within a state is resisted in every

form, the most dangerous weapon of spiritual tyranny is broken. Moreover, there must be maintained, not merely unconditional freedom of teaching for strict science as well as for its popularisation, but also free scope for public criticism of all wrongs and abuses. That it is the right and duty of the State, so far as it continues to support existing religious communities with its power and resources, to require from their clergy a certain standard of scientific culture is obvious; and we must guard against neglecting these duties, and losing ourselves in the labyrinth of a so-called separation of Church and State. There is only a clear and good sense in the separation of state and faith. Every ecclesiastical organisation of a community of believers is already a state within the state, and may at any moment easily encroach upon the secular province. There may be circumstances in the conditions of civilisation by which such a power may be justified, and may, in fact, be destined to shatter a rotten and outlived form of government; as a rule, however, and especially in our present age, which is more and more assigning to the State the civilising functions that were formerly left to the Church, the political organisation of the latter must simply be to the State a matter of distrust and the most serious anxiety. Only with the dissolution of the political Church is an unconditional freedom of creed possible. At the same time, so long as the Church, with all its ambitious aspirations, still represents also Ethical Idealism among the people, it cannot be the function of the State to aim at the dissolution of its dogmatic system. Fichte, indeed, demanded that the spiritual teacher to whom it falls to mediate between the people and the men of scientific culture, should actually form his religious system in the school of the philosopher. Theology he proposed, unless she solemnly renounced her 'pretension to be a mystery,' to banish entirely from the universities; but if she renounced it, then the practical

part of theology must be separated from the scientific part, and the latter be completely resolved into general scientific education.[42] This in itself justifiable requirement is at present still less practicable than when Fichte expressed it. The task of mediation between the people and the better educated, even when it is attempted with all earnestness, is only to be performed by observing the psychological conditions, and that means only gradually and in long periods. But even the imparting of a sufficiently deep philosophical culture to the clergy cannot be effected by a mere organisation of studies. Meanwhile the cultivation of the ideal amongst the people must not be interrupted. It is, of course, to be wished that every clergyman should at least be enlightened as to the limits of the validity of the ideal; but if, because of narrowness of mind and lack of suitable means of instruction, this cannot be without weakening the force which is destined to spread ideas, then it is, on the whole, better for the present to sacrifice enlightenment rather than force.

The case of the Materialistic man of science, on the other side, is entirely analogous. Without doubt, the success of his beneficent and self-sacrificing researches essentially depends upon his devotion to the branch of human activity which he has chosen. There cannot be the slightest doubt that only methodically strict empiricism leads him to the goal, that keen and unprejudiced contemplation of the sensible world and unhesitating consistency in his conclusions are indispensable to him; finally, that Materialistic hypotheses always offer him the greatest prospect of fresh discoveries. If his mind is deep and comprehensive enough to combine with this ordered activity the recognition of the ideal, without introducing confusion, obscurity, or sterile timidity into the sphere of his researches, he then assuredly reaches a higher

[42] Deducirter Plan einer zu Berlin geschrieben im J. 1807: Stuttg. u. zu errichtenden höhern Lehranstalt; Tüb. 1817, S. 59 ff.

standard of genuine and complete humanity. But if this cannot be hoped for, it is in most cases far better in these departments to have crass Materialists than phantasts and muddled weaklings. As much of the ideal as is indispensably necessary—and more than the great mass of men ever attain—is already involved in the mere devotion to a great principle and to an important subject. Those Materialists who really accomplish something in their science will, for the most part, have little inclination to play the missionary of negation; and even if they do, they do less harm to mankind than the apostles of confusion.

If, however, both extremes, even in their one-sidedness, are really justifiable, then, too, it must be possible for them to live together in society at least tolerably, if not comfortably, so soon as the last traces of fanaticism are eradicated from our legislation. Whether, of course, this will ever come to pass, is quite another question. It is with the religious revolution just as it is with the social revolution which is before us. It would be very desirable to live through the period of transition in peace, but it is more probable that it will be stormy.

Thus the Materialistic controversy of our days stands before us as a serious sign of the time. To-day again, as in the period before Kant and before the French Revolution, there underlies the spread of Materialism a general enfeeblement of philosophical effort, a retrogression of ideas. In such times the perishable material to which our forefathers gave the stamp of the sublime and divine, as they could comprehend them, is devoured by the flames of criticism, like the organic body, which, when the vital spark dies out, becomes subject to the more general action of chemical forces, and has its earlier form destroyed. But, as in the circuit of nature from the decay of lower materials new life struggles into being and higher phenomena appear where the old have disappeared, so we may

expect that a new impulse of ideas will advance humanity another stage.

Meanwhile the dissolving forces act only as they must. They obey the inexorable categorical imperative of thought, the conscience of the understanding, which is awakened so soon as in the creation of the transcendental the Letter becomes conspicuous because the Spirit leaves it in search of newer forms. But one thing only can finally bring humanity to an ever-during peace—the recognition of the imperishable nature of all poesy in Art, Religion, and Philosophy, and the permanent reconciliation, on the basis of this recognition, of the controversy between investigation and imagination. Then, also, will be found a changeful harmony of the True, the Good, and the Beautiful, instead of that dead unity to which our Free Congregations are at present clinging, when they make empirical truth their only basis. Whether the future will again build lofty cathedrals or will content itself with light and cheerful halls, whether organ-peal and the sound of bells will with fresh force thunder through the land, or whether gymnastic and music in the Greek sense will be elevated to the centre of the training of a new epoch—in no case will the past be entirely lost, and in no case will the obsolete reappear unaltered. In a certain sense the ideas of religion, too, are imperishable. Who will refute a Mass of Palestrina, or who will convict Raphael's Madonna of error? The 'Gloria in Excelsis' remains a universal power, and will ring through the centuries so long as our nerves can quiver under the awe of the sublime. And those simple fundamental ideas of the redemption of the individual man by the surrendering of his own will to the will that guides the whole; those images of death and resurrection which express the highest and most thrilling emotions that stir the human breast, when no prose is capable of uttering in cold words the fulness of the heart; those doctrines, finally, which bid us to share our bread with the hungry

and to announce the glad tidings to the poor—they will not for ever disappear, in order to make way for a society which has attained its goal when it owes a better police system to its understanding, and to its ingenuity the satisfaction of ever-fresh wants by ever-fresh inventions. Often already has an epoch of Materialism been but the stillness before the storm, which was to burst forth from unknown gulfs and to give a new shape to the world. We lay aside the pen of criticism at a moment when the Social Question stirs all Europe, a question on whose wide domain all the revolutionary elements of science, of religion, and of politics seem to have found the battlefield for a great and decisive contest. Whether this battle remains a bloodless conflict of minds, or whether, like an earthquake, it throws down the ruins of a past epoch with thunder into the dust and buries millions beneath the wreck, certain it is that the new epoch will not conquer unless it be under the banner of a great idea, which sweeps away egoism and sets human perfection in human fellowship as a new aim in the place of restless toil, which looks only to the personal gain. It would indeed mitigate the impending conflict if insight into the nature of human development and historical processes were more generally to take possession of the leading minds; and we must not resign the hope that in a distant future the greatest transformations will be accomplished without humanity being stained by fire and blood. It were indeed the fairest guerdon of exhausted intellectual labour if it might even now contribute, while averting fearful sacrifices, to prepare a smooth path for the inevitable, and to save the treasures of culture uninjured for the new epoch; but the prospect of this is slight, and we cannot hide from ourselves that the blind passion of parties is on the increase, and that the reckless struggle of interests is becoming less and less amenable to the influences of theoretical inquiries. Yet our efforts will never be wholly in vain. The truth, though

late, yet comes soon enough; for mankind will not die just yet. Fortunate natures hit the right moment; but never has the thoughtful observer the right to be silent because he knows that for the present there are but few who will listen to him.

PREFACE TO THE SECOND BOOK

[*AS POSTSCRIPT*].

THE appearance of the Second Book, and especially of its second half, has been long delayed by the aggravation of a serious illness, which leaves me little strength to devote to work. This has also made it impossible for me to include in my discussions certain important works which have recently appeared, and which are closely connected with my subject. In particular, I regret this with regard to Tyndall's Address on Religion and Science, and the three Essays on Religion of Stuart Mill.

Tyndall's address is, as it were, the official announcement of a new era for England, which plays so important a part in the History of Materialism. The old hollow truce between natural science and theology, which Huxley, and recently Darwin, had seriously shaken, is now broken, and men of science demand their right to follow out in all directions, undisturbed by any subsisting traditions, the consequences of their theory of the world. The continuance of religion is indeed secured by the Spencerian philosophy, but it will henceforth no more be considered a matter of indifference with what dogmas and what demands upon our credulity religious feelings find expression. And thus commences a struggle, such as earlier took place in Germany, which can only find a peaceful

termination by the removal of religion into the sphere of the ideal.

It was to me extremely remarkable how near in his Essay on Theism, the last great work of his life, Stuart Mill approached to the view which is also established as the result of our History of Materialism. The inexorable empiricist, the champion of the utilitarian philosophy, the man who, in so many earlier works, appeared to recognise only the rational principle, here makes the confession that the narrow and inadequate life of man needs greatly to be exalted to loftier hopes of our destiny, and that it seems wise to let imagination shape these hopes, so long as it does not come into conflict with obvious facts. As the cheerfulness of soul which every one appreciates rests upon the inclination to linger in thought upon the lighter side of the present and the future, and this means an involuntary idealisation of life, so we are to think more favourably of the government of the universe and of our future condition after death than the very slender probability would permit: nay, this ideal character of Christ is represented not only as a principal feature of Christianity, but as something that even the unbeliever can appropriate. How far is it from this to our ideal standpoint! The slight, rapidly disappearing probability that the dreams of our imagination can be realised is at best a weak tie between Religion and Science, and at bottom only a weakness in the whole system, for it is opposed by a greatly preponderating probability the other way, and in the sphere of reality the morality of thought demands from us that we shall not cling to vague possibilities, but shall always prefer the greater probability. If the principle is once conceded that we should create for ourselves in imagination a fairer and more perfect world than the world of reality, then we shall be compelled to allow validity to Mythus as Mythus. But it is more important that we shall rise to the recognition that it is the same necessity, the same transcendental

root of our human nature, which supplies us through the senses with the idea of the world of reality, and which leads us in the highest function of nature and creative synthesis to fashion a world of the ideal in which to take refuge from the limitation of the senses, and in which to find again the true Home of our Spirit.

A. LANGE.

MARBURG, *2d January* 1875

INDEX.

Abraham, iii. 16
Adam, iii. 16, 107
Adams, John Couch, iii. 9
Adhémar, iii. 92
Ænesidemus, i. 176
Æschylos, i. 6
Agassiz, iii. 88
Albertus Magnus, i. 209; ii. 356
Alcuin, i. 188
Alexander of Aphrodisias, i. 94, 221, 224
Alexander the Great, i. 51, 83, 99, 100, 118
Alkibiades, i. 61
Alsted, ii. 356
Amerbach, i. 228
Ammann, ii. 62, 68
Ampère, A. M., ii. 365, 370, 379
Anaxagoras, i. 6, 9, 20, 53, 64, 65, 135; ii. 355
Anaximander, i. 8, 9, 114
Anaximenes, i. 9
Andokides, i. 7
Antipater, i. 100
Apelt, ii. 155
Apollonius of Tyana, i. 170
Aquinas. See Thomas Aquinas
Archimedes, i. 114
Archytas, i. 120
Argens, Marquis d', ii. 77, 137
Aristarchus of Samos, i. 118, 120, 278
Aristarchos of Samothrace, i. 114, 232
Aristippos, i. 44, 45, 50, 51, 102, 103, 128; ii. 54; iii. 233, 238, 302
Aristodemos, i. 61
Aristophanes, i. 7, 40, 48, 63
Aristotle, i. 5, 7, 8, 9, 15, 17, 18, 20, 24, 25, 26, 27, 28, 29, 30, 33, 41, 45, 48, 53, 54, 56, 59, 60, 64, 68, 69, 76, 78, 80–92, 93, 94, 95, 96, 99, 108, 112, 118, 124, 138, 140, 158, 167, 177, 178, 179, 187–195, 198–203, 205, 210, 212, 213, 217, 222, 223, 226–229, 254, 257, 277, 278, 282, 303, 322; ii. 33, 41, 157, 250, 265, 277; iii. 33, 169, 279
Aristoxenos, i. 93, 94
Arnobius, ii. 62
Arnold, ii. 142
Arnoldt, Emil, ii. 154, 202
Augustus Cæsar, i. 131
Augustine, St., i. 262, 263; iii. 15
Averroes, i. 94, 175, 177, 178, 226; ii. 45
Avicenna, i. 178, 208
Avogadro, ii. 359, 360, 375

Bacon, Francis, i. 11, 15, 20, 22, 115, 213, 216, 228, 235, 236, 237, 239, 240, 241, 242, 244, 253, 254, 275, 276, 277, 286, 294, 296, 317; ii. 3, 12, 34, 50, 287, 304, 343, 344
Bacon, Roger, ii. 3
Baer, iii. 102
Baier, Johann Jakob, ii. 135
Baier, Johann Wilhelm, ii. 135
Bain, Alexander, iii. 186, 187, 190, 191
Baldæus, ii. 36
Baltzer, iii. 294
Barach, i. 209
Barchusen, ii. 356
Bardili, i. 221
Bartholmèss, i. 233
Basil the Great, i. 186
Bastian, iii. 18, 182
Batalin, iii. 73
Bauer, Bruno, ii. 284
Baumann, i. 288; ii. 31, 125, 132
Baumann (Maupertuis), Dr., ii. 31
Baumgarten, i. 197
Baur, i. 62, 170
Bayle, P., i. 217; ii. 9, 10, 11, 17, 34, 38, 47, 88, 127

Beattie, ii. 8, 206
Becker, K. F., i. 212
Becker, J. C., ii. 188
Beier, ii. 135
Bekker, Balthasar, ii. 35
Bell, Sir Charles, i. 119
Bellarmine, Cardinal, i. 279
Beneke, ii. 247; iii. 306
Bennet, iii. 48, 49
Bentley, i. 315; ii. 210
Bergmann, ii. 148
Berkeley, Bishop of Cloyne, i. 38, 109; ii. 50, 112, 129, 157, 158, 159, 164, 275, 327; iii. 205
Bernays, i. 143
Bernhardy, i. 129
Bernier, i. 266, 267
Bernouilli, Daniel, ii. 374
Bernouilli, Johann, i. 313
Bert, Paul, iii. 179
Berzelius, ii. 360
Biedermann, ii. 126, 143
Bilfinger, ii. 134; iii. 170
Blaigny, ii. 39
Blanqui, Auguste, i. 151
Blass, i. 7
Blumenbach, iii. 87, 106
Boccaccio, i. 217
Boerhaave, ii. 55, 56, 78, 356
Böhmer, H., ii. 244
Bonaparte family, i. 272
Boniface, ii. 28
Bonitz, i. 188
Bonnet, Charles, iii. 16
Bopp, Franz, iii. 181
Borelli, i. 310
Börne, ii. 257
Boscovich, ii. 364
Boucher de Perthes, iii. 89, 95
Bourgeois, the Abbé, iii. 90
Bourignon, Antoinette, iii. 169
Boyle, Robert, i. 125, 255, 299–305, 309, 317; ii. 3, 8, 12, 33, 146, 351, 353, 356, 363, 364, 374
Brandis, i. 18, 39
Brehm, iii. 136
Brentano, iii. 168, 175, 193, 228
Brewster, i. 306
Brown, Thomas, iii. 186
Browne, Sir Thomas, i. 317
Bruck, Von, ii. 262
Brunet, ii. 36
Brutus, i. 128
Bucher, ii. 38
Büchner, Dr. Louis, i. 41, 261; ii. 240, 265-276, 281, 298, 302, 306, 307, 351, 366, 368, 370, 388; iii. 26, 85, 119–121, 303, 304, 324
Büchner, Louise, ii. 270
Buckingham, i. 294
Buckle, i. 9, 248, 261, 294, 298, 299, 301, 317; ii. 11; iii. 234, 235, 246, 247, 329
Buffon, ii. 6, 52, 93, 356; iii. 87

Cabanis, ii. 63, 93, 242, 243
Cæsar, Julius, ii. 67
Cagliostro, i. 170
Caligula, i. 167
Camper, iii. 87
Cardan, i. 225
Carey, i. 161; iii. 253
Carrière, i. 221, 233, 234
Cartouche, ii. 14
Carus, iii. 134, 135; 167
Cassius, i. 128
Castle, iii. 115, 116
Cato, i. 127
Cauchy, ii. 365, 368, 369, 370
Cavendish, Lord, i. 271, 277
Celsus, i. 176
Charles the Great, i. 163, 189
Charles II. of England, i. 273, 294; ii. 293, 294, 302, 317
Charron, i. 260; ii. 9
Christ. See Jesus
Christine, the Grand Duchess, i. 234
Chrysippos, i. 103, 111, 127
Cicero, i. 8, 24, 127, 128, 129, 232, 326; ii. 42, 98
Clarke, i. 301; ii. 8, 14, 16, 116, 117
Clausius, ii. 374, 384; iii. 11
Clavius, i. 269
Clement VII. (Pope), i. 231
Cohen, Hermann, ii. 154, 173, 178, 190, 202, 216, 217, 219; iii. 171, 306
Colbert, iii. 253
Coleridge, i. viii.
Colingwood, J. F., ii. 265
Colland, iii. 96
Columbus, Christopher, i. 118, 124 138
Combe, iii. 121
Combette, iii. 116
Comenius, ii. 41
Comte, Auguste, ii. 154, 220, 235, 247, 248, 255, 256, 335; iii. 176, 190, 260, 272, 276, 296, 300
Condillac, i. 38; ii. 50, 51, 52, 53, 63; iii. 209

Condorcet, i. 210, 213
Constantine, iii. 318
Constantine the Monk, i. 181
Contzen, i. 163, 164
Cooper, iii. 251
Copernicus, i. 81, 92, 115, 118, 137, 138, 229, 230, 231, 232, 237, 263, 264, 277, 278, 307, 313; ii. 156, 158, 237, 335, 344; iii. 247
Corneille, ii. 69
Cornelius, iii. 164
Cotes, i. 316
Cotta, Bernard, iii. 118
Cousin, Victor, i. 247, 253
Cowper, ii. 74
Crassus, iii. 256
Cremonini, i. 220; ii. 164
Cromwell, Oliver, i. 272; iii. 274
Cudworth, ii. 43
Cunningham, ii. 23
Curtius, i. 6
Cus, Nicholas de, i. 231
Cuvier, George, i. 83; iii. 87, 88, 99, 105, 130
Czolbe, Henri, ii. 214, 215, 218, 246, 284–294, 298, 322; iii. 7, 12, 217, 224, 313, 315, 316

D'Alembert, ii. 16, 27, 31, 32, 52, 92, 157; iii. 205
Dædalos, i. 29
Dalton, i. 255; ii. 354, 355, 357–359, 363
Damm, ii. 145
Dante, i. 177, 182
Daremberg, i. 181, 182
Darwin, Charles, i. 32, 35; ii. 132, 239, 292; iii. 26, 27, 30–32, 35, 44, 45, 49, 51–53, 58, 65, 89, 93, 102, 103, 108, 183, 327, 363
Delaunay, the Abbé, iii. 89
Delbœuf, ii. 180
Demokritos, i. 3, 13, 14, 15, 16, 17, 18, 20, 22, 23, 24, 25, 27–32, 35, 38, 39, 41, 42, 45, 46, 56, 59, 81, 93, 95, 99, 104, 105, 111, 115, 120, 123–125, 132, 140, 141, 142, 167, 201, 236, 254, 255, 269, 287, 289, 304, 316; ii. 28, 33, 47, 157, 226, 240, 389
Demosthenes, i. 50, 99
Descartes, i. 12, 29, 98, 125, 201, 216, 228, 235, 236, 241, 242, 243–248, 253, 260–262, 263, 268, 269, 276, 280, 304, 305, 309, 310, 312, 313, 314, 317; ii. 9, 10, 15, 16, 34, 59, 60, 65, 67, 76, 111, 126, 157, 311, 316, 325, 352, 353, 354, 363; iii. 130, 170, 183, 188
Deslandes, ii. 90
Desnoyers, iii. 89
Dewar, ii. 198
Diagoras of Melos, i. 6, 7
Dikæarchos, i. 93, 94; ii. 45
Diderot, ii. 9, 23–26, 27, 28, 31, 32, 52, 71, 72, 90, 92, 95, 108, 109, 121, 122, 235; iii. 78
Dilthey, iii. 306, 310
Diogenes, i. 50; iii. 239
Diogenes of Apollonia, i. 4, 7, 13, 28, 96
Diogenes Laertius, i. 130, 150
Dionysius of Syracuse, i. 50
Dohrn, ii. 148
Domrich, iii. 183
Dove, ii. 259
Draper, J. W., i. 167, 179, 181
Drobisch, iii. 185, 196, 198, 222
Droz, ii. 75; iii. 111
Dryden, i. 295
Du Bois-Reymond, ii. 13, 16, 131, 308–325, 378, 381; iii. 74, 156, 311, 324
Dühring, i. 302, 310; ii. 376; iii. 227
Dulong, ii. 360

Ehrenberg, ii. 259; iii. 18
Ekphantos, i. 232
Eimer, iii. 179
Empedokles, i. 8, 20, 30, 33–36, 130, 135, 136; ii. 102, 226, 356; iii. 32, 36
Enke, iii. 10
Epicuros, i. 7, 15, 17, 24, 25, 26, 31–34, 35, 39, 40, 45, 94, 98, 99, 100–113, 128, 129–132, 150, 151, 152, 154, 165, 167, 174, 176, 201, 253, 254, 256–258, 263, 265, 266, 283, 291; 296, 304, 306, 316; ii. 9, 47, 96, 101, 113, 123, 124, 158, 212, 243, 288, 352; iii. 3, 98, 233, 238, 239, 278, 352
Erasistratos, i. 115
Erasmus, i. 216; ii. 34
Eratosthenes, i. 120
Erdmann, ii. 124
Esquirol, ii. 259
Ettmüller, Michael, ii. 48
Eucken, i. 81, 83, 88
Euklid, i. 114, 117; ii. 171, 178, 179, 180
Euripides, i. 7, 50
Eve, iii. 107

Fabricius, J. Alb., ii. 145
Famintzin, iii, 73
Faraday, ii. 3, 365, 385; iii. 163
Fechner, G. Th., i. 255; ii. 198, 364–368, 388, 394, 395, 396; iii. 24, 25, 43, 44, 47, 70, 153, 311
Fermat, i. 248; ii. 16
Ferrier, iii. 145, 150
Feuerbach, ii. 246–256, 275, 276, 277, 284, 286, 335, 345; iii. 260, 332, 333
Feuerlein, ii. 144
Fichte, J. H., i. 54, 236; iii. 191, 226, 238, 242; iii. 175, 286, 311, 349–351, 352, 357, 358
Fichte, son, ii. 347
Fick, iii. 204
Filhol, iii. 94
Fischer, J. C., iii. 194
Fischer, Kuno, i. 237, 276, 280; ii. 51, 125, 154, 190, 191, 212
Flourens, ii. 259; iii. 116, 130, 132, 133, 134, 138
Fontenelle, ii. 16
Forster, ii. 141
Fortlage, i. 202; iii, 170, 173, 174
Fraas, iii. 90, 91, 94
Franck, Ad., i. 231, 237, 235
Frank, iii. 73
Franke, iii. 351
Franklin, Benjamin, iii. 265
Frantzen, ii. 137
Fredegisus, i. 188
Frederick the Great, i. 293; ii. 53, 54, 77, 89–91
Frederick II., Emperor of Germany, i. 182, 183, 217
Frei, i. 15, 39, 41, 43
Fresnel, ii. 363
Fries, ii. 155

Galen, of Pergamos, i. 119–121, 176, 224, 237; iii. 169
Galilei, i. 27, 114, 138, 216, 220, 231, 237, 248, 264, 278, 309, 310
Gall, iii. 113, 114, 122, 163
Garrigou, iii. 94
Gassendi, i. 125, 128, 201, 216, 217, 225, 235, 245, 253–269, 278, 286, 290, 291, 304, 327; ii. 3, 9, 29, 90, 101, 352, 356, 363, 364, 374
Gassner, i. 170
Gauss, ii. 385, 396
Gay, ii. 5
Gay-Lussac, ii. 359, 365
Gegenbaur, iii. 41
Genthe, i. 182; ii. 36
Geoffroy, St. F., ii. 357
Geoffroy de St. Hilaire, iii. 87
George, iii. 176
Gerhard, i. 6, 180
Gerland, iii. 72, 182
Gesenius, ii. 137
Gervinus, ii. 144, 257
Gesner, J. M., ii. 144, 145
Gessner, Konrad, i. 228, 229; ii. 144, 145
Gessner, Jacob, i. 229
Gibbon, i. 162, 164, 170
Gilbert, W., i. 237; iii. 163, 247
Giordano Bruno, i. 231, 232, 234, 235, 259
Gleim, ii. 145
Gliddon, iii. 106
Gmelin, i. 299, 303
Goethe, Wolfgang von, i. 33; ii. 28, 96, 108, 142, 148–150, 218, 236, 244; iii. 38, 61, 87, 88, 193, 319, 331
Goltz, iii. 127
Gorgias, i. 39, 59
Gracchus, Tiberius, and Caius, iii. 264
Grässe, ii. 135
Grassmann, ii. 187
Grimm, Baron, ii. 90, 93, 102, 109, 121
Grote, G., i. 40, 41
Grutzmacher, i. 222
Gutenberg, iii. 132
Gutzkow, ii. 246, 260

Hæckel, Ernest, iii. 19, 20, 23, 24, 42, 55, 56, 59, 60, 62, 63, 64, 108
Hagedorn, ii. 145
Hagenbach, i. 314, 315
Haller, Albrecht von, ii. 64, 137, 138, 218; iii. 169
Halley, i. 315
Hamilton, Sir William, i. 210
Hammer, i. 183, 184, 185
Hankel, ii. 184, 187
Hannibal, i. 126
Hansemann, ii. 258
Hartley, David, ii. 4–9; iii. 189
Hartmann, Ed. von, i. viii., 329; iii. 71–73, 75, 77, 78, 313
Harvey, i. 237, 246, 278; iii. 247
Häser, i. 181
Hauréau, i. 219
Hegel, i. 30, 40, 57, 82, 93, 236, 279; ii. 49, 50, 53, 196, 226,

236, 237–240, 246, 247, 252, 254, 257, 260, 265, 275, 276, 284, 300, 301, 303, 346; iii. 80, 272, 288, 307, 311, 320, 325, 352
Heim, iii. 102
Heine, Heinrich, ii. 245, 257
Heinroth, ii. 259
Heliogabalus, i. 167
Helmholtz, Hermann, ii. 75, 188, 307, 321, 336, 385, 391, 392, 393; iii. 3, 4, 8, 10, 11, 22, 24, 155, 180, 204, 215, 216, 222, 227–230
Helmont, Van, iii. 14
Helvetius, ii. 51, 52, 84, 87, 93, 114; iii. 242, 249
Hengstenberg, ii. 260
Henle, iii. 209
Hennings, ii. 129, 140; iii. 16
Hensen, iii. 180
Herakleides, i. 232
Herakleitos, i. 8, 16, 19, 39, 74, 77, 135; ii. 226, 265
Herbart, i. 194, 321; ii. 189, 196, 300; iii. 163–167, 288, 311
Herbert of Cherbury, ii. 36
Herder, ii. 22, 141, 244
Hermann, i. 6, 15; iii. 144, 145, 155
Hermolaus Barbarus, ii. 41
Herodotus, i. 15, 83
Herophilos, i. 115
Herschel, i. 237; ii. 170
Hertwig, iii. 132
Hesiod, i. 99
Hettner, i. 294, 295, 310, 320, 325; ii. 4, 7, 10, 11, 13, 14, 17, 19, 20, 24, 35, 51, 82
Hiketas, i. 232
Hildebrand, ii. 62
Hipparchos, i. 114, 120; iii. 7
Hippias, i. 39
Hippokrates, i. 40, 93, 224
Hitzig, iii. 145, 149, 150, 153
Hobbes, Thomas, i. 38, 211, 213, 214, 216, 225, 235, 236, 254, 256, 257, 269–290, 291, 292, 296, 297, 298, 299, 300, 301, 304, 309, 311, 317, 318; ii. 3, 6, 9, 10, 12, 18, 19, 21, 28, 29, 34, 36, 38, 50, 51, 84, 90, 104, 115, 143, 146, 148, 248, 304, 305, 353, 354, 363
Hocheisel, ii. 38
Hofmann, ii. 372
Hofmeister, iii. 73
Holbach, Baron, ii. 25, 26, 50, 51, 80, 87, 90, 94–123, 129, 134, 148, 158, 256, 355
Hölderlin, ii. 284
Hollman, ii. 139
Homer, i. 85, 115, 224
Hooke, i. 314, 315
Horace, i. 128, 165, 166; iii. 263
Horwicz, iii. 126
Howen, i. 258
Huizinga, iii. 18
Humboldt, Alexander von, ii. 236, 239, 258
Humboldt, Wilhelm von, i. 83, 121, 179, 180, 184, 185, 186, 229–231, 232; ii. 210, 236; iii. 181
Hume, David, ii. 8, 50, 159, 162, 170, 204–211, 212, 215, 235, 304, 313, 324
Huschke, iii. 134
Huxley, i. vii., 3, 19, 20, 353
Huyghens, i. 309, 310, 312, 327; ii. 376
Hypatia, i. 120

Idelер, ii. 223
Isaac, iii. 16

Jacobi, ii. 139, 148
Jäger, iii. 102
Janet, Paul, ii. 248
Jean de Brescain, i. 218
Jerusalem, ii. 8
Jesus, i. 182, 222; iii. 322, 364
Jobert de Lamballes, ii. 60; iii. 127
John, i. 306
Johnson, Ed., ii. 294; iii. 187
Joly, iii. 14
Joshua, i. 305
Julian, Emperor, i. 62, 170; ii. 289
Jurain, the Abbé, ii. 6
Justi, ii. 143, 145
Juvenal, i. 165, 166

Kant, i. 12, 19, 28, 30, 42, 54, 55, 98, 194, 196, 197, 236, 247, 262, 292, 311, 316, 322; ii. 5, 17, 18, 19, 23, 29, 50, 83, 93, 114, 116, 133, 136, 137, 153–170, 174, 178, 179, 180, 181, 183–205, 209–212, 215, 216, 217–234, 236–240, 244, 247, 249, 250, 251, 265, 266, 267, 275, 277, 282–284, 286, 287, 305, 322, 324, 369, 379, 386, 393; iii. 3, 4, 9, 23, 69, 70, 86, 96, 108, 118, 165, 168, 169, 171, 190, 194, 196, 197, 198, 205, 224, 233, 247, 279, 282–284, 286, 306, 314, 315, 320, 326, 342, 349, 359
Kekulé, ii. 363, 373

Keller, Dr. Ferdinand, iii. 100
Kepler, i. 115, 138, 216, 230, 231, 237, 278, 308; ii. 32, 155; iii. 247
King, ii. 5
Kirchmann, i. 202, 203, 276; ii. 322
Klein, Dr. H., ii. 383; iii. 89
Klopstock, ii. 146, 237
Knight, iii. 73
Knutzen, Martin, ii. 136
Knuzen, Matthias, ii. 35
Koelliker, Albert, iii. 52–54, 56
Köhler, ii. 144
Kolbe, ii. 372; iii. 56
Kopp, i. 299; ii. 352, 355, 356
Kortholt, ii. 36, 37
Kriegk, i. 172
Kroenig, ii. 374
Kussmaul, iii. 180

Lachmann, i. 133, 143
Lagrange, ii. 95, 102
Lamarck, i. 35; iii. 46
La Mettrie, i. 38, 147, 241, 243, 246, 291, 292; ii. 9, 14, 25, 26, 29, 49–92, 93, 110, 116, 121, 138, 139, 240, 270; iii. 87
La Mothe le Vayer, ii. 9, 10, 34
Lang, Pastor, iii. 287, 290
Lange, F. A., i. ix.–xiv.
Lange, Dr. J. P., i. ix.
Langsdorf, iii. 77
Langwieser, ii. 313, 314, 317, 325
Laplace, ii. 16, 72, 132, 155, 268, 308, 309, 310, 314, 317, 319; iii. 4, 7, 9, 77, 314, 315
Lartet, iii. 90
Lasaulx, E. de, i. 170, 171
Lassalle, i. xi.
Lasson, iii. 306, 307
Lau, T. L., ii. 35
Laube, ii. 246
Launoy, i. 269
Lavater, ii. 141
Lavoisier, ii. 334, 335
Law, ii. 5
Lecky, i. 163, 164, 168–171, 180
Legendre, ii. 181, 182
Leibniz, i. 12, 98, 194, 236, 242, 307, 313, 322, 326; ii. 6, 14, 15, 29, 59, 65, 67, 111, 112, 124–134, 141, 145, 147, 157, 179, 180, 196, 275, 305; iii. 165, 170, 188, 309
Leo X., Pope, i. 223
Leon, i. 63
Leonardo da Vinci, i. 217, 237
Lerminier, i. 248
Le Sage, i. 314; ii. 374
Less, iii. 169
Lessing, ii. 11, 22, 126, 139, 140, 146; iii. 331
Leukippos, i. 20, 269, 316
Leuret, ii. 259
Lewes, i. 10, 15, 40, 44, 61, 64, 67, 72, 73
Lexis, iii. 234, 235, 237
Lichtenberg, i. 232, 262; ii. 126, 141, 147; iii. 205, 206
Liebig, i. 161, 180, 236, 237, 301; ii. 258, 297, 298, 329–331, 342–344, 361
Liebmann, ii. 154, 195; iii. 228
Linné, ii. 52; iii. 42
Litaudus, i. 269
Littré, ii. 248
Littrow, i. 306, 313
Locke, i. 38, 76, 211, 213, 236, 288, 301, 318–325; ii. 5, 14, 15, 17, 18, 19–22, 30, 34, 39, 50, 51, 61, 64, 132, 133, 158, 160, 286, 304; iii. 119
Loewenthal, iii. 295
Longet, ii. 259; iii. 116, 117, 133
Lotze, ii. 285, 347; iii. 175, 196, 212, 227
Louis XIV., i. 293; ii. 10, 11
Lowndes, i. 319
Lubbock, Sir John, iii. 92, 96, 98, 182
Lucian, i. 170
Lucretius, i. 24, 25, 27, 34, 105, 126, 128, 255, 266, 267, 283; ii. 29, 83, 101, 115, 123, 374; iii. 278, 292, 293
Luther, i. 227, 248; ii. 334; iii. 274, 348, 355
Luzak, Elie, ii. 77
Lyell, Sir Charles, ii. 329; iii. 45, 89, 92, 97
Lysias, i. 7

Macaulay, i. 237, 293, 294, 298
Macchiavelli, i. 222, 223
Mach, ii. 388
Mæcenas, i. 131
Magendie, ii. 259
Mahaffy, ii. 163, 205, 223
Malebranche, ii. 57, 67, 111
Malthus, iii. 265, 266
Mandeville, i. 295; ii. 22, 23, 79, 80; iii. 242, 249
Manetho, i. 114
Marbach, i. 8
Marcus Aurelius, i. 163

Mariotte, i. 301, 302; ii. 375
Marius, i. 128
Martin, i. 231
Marx, i. 295, 319, 320; ii. 23; iii. 265
Maudsley, iii. 193
Maupertuis, ii. 16, 25, 31, 52, 137
Maxwell, ii. 382, 383, 384, 385
Mayer, ii. 307, 392; iii. 8, 9, 10
Maywald, i. 218, 219
M'Kendrick, ii. 198
Meier, G. F., i. 6; ii. 136; iii. 16
Meiklejohn, ii. 184
Meiners, i. 181, 182
Melanchthon, Philip, i. 227, 231, 238; ii. 34, 42, 45, 46, 62; iii. 170
Memmius, i. 129, 130
Mendelssohn, ii. 137
Mersenne, i. 225, 248, 256, 273, 278, 280
Meyer, Jürgen Bona, ii. 136, 154, 190; iii. 225
Meyer, Lothair, ii. 360, 372, 387
Meynert, iii. 139, 140
Mill, John Stuart, i. xi., 210, 211, 214, 237; ii. 170–178, 182–187, 193, 213–215, 235, 321; iii. 189, 193, 260, 265, 269, 271, 274, 276, 300, 363, 364
Mitscherlich, ii. 361
Mohammed, i. 182, 184, 222
Mohl, Hugo von, ii. 303, 332; iii. 265
Mohl, Von, ii. 346
Moigno, the Abbé, ii. 365
Moleschott, i. 41, 292; ii. 60, 241, 259, 264, 271, 272, 273, 275, 277–281, 286, 377, 378, 381; iii. 26, 127, 179
Molesworth, i. 274, 275
Mommsen, i. 166
Montaigne, i. 245, 260; ii. 9, 34, 88
Montesquieu, ii. 52
Mook, iii. 295
More, Sir Thomas, i. 323; iii. 272
Morhof, i. 317; ii. 144
Mortillet, iii. 90
Moscati, iii. 86
Moses, i. 174, 182, 222, 233, 284
Mosheim, ii. 37
Mozart, iii. 61
Mullach, i. 15, 16, 17, 20, 22, 23, 26, 27
Müller, Johannes, ii. 259; iii. 114, 130–132, 206–209, 216
Mundt, ii. 246, 260
Munro, i. 130, 140
Musset, iii. 14

Nadir Schah, ii. 14
Naegeli, iii. 52, 54
Naigeon, ii. 50, 95
Naudäus, Gabriel, i. 245, 258
Naumann, i. 255; ii. 374
Nausiphanes, i. 99
Nees von Esenbeck, ii. 346
Nero, i. 131, 167
Neumann, C., ii. 396
Neumann, F. E., ii. 385
Newton, i. 125, 138, 201, 255, 267, 269, 296, 299, 301, 303, 306–317, 327, 329; ii. 3, 8, 12, 14, 15, 16, 26, 146, 155, 156, 304, 337, 345, 353, 355, 356, 363, 375, 383, 384, 396; iii. 3
Nicolaus of Autricuria, i. 225, 226
Niebuhr, ii. 210, 236
Nietzsche, i. 62
Noah, iii. 27, 115
Nothnagel, iii. 145, 146, 149
Nott, iii. 106

Occam, i. 210, 211, 213, 214; ii. 3
Oersted, ii. 215; iii. 163
Oettingen, iii. 198
Oken, i. 35; ii. 237, 346; iii. 20
Origen, i. 170
Osiander, i. 230
Oswald, ii. 8, 206
Owen, ii. 77; iii. 273
Oxenford, i. 280

Paetus, Thrasea, i. 131
Palestrina, iii. 360
Palleske, ii. 28
Paracelsus, i. 239, 240; ii. 33; iii. 14
Parmenides, i. 19
Pascal, Blaise, i. 245, 248, 259, 302; ii. 10, 16
Pasteur, iii. 14, 18, 23
Paul III., Pope, i. 230
Peirescius, i. 258
Peisse, Louis, ii. 242, 312
Pemberton, i. 309
Perikles, i. 46, 48, 49, 167
Petit, ii. 360
Petrarca, i. 217, 226
Petronius, i. 165; ii. 67
Petty, i. 320
Pfeffer, iii. 73
Pfeuffer, iii. 209
Pflüger, iii. 19, 126, 127
Pheidias, i. 40, 46
Philippos the actor, i. 29
Philolaos, i. 278

Picard, i. 310
Piderit, iii. 125
Pinel, ii. 113
Pistorius, ii. 6
Plato, i. 5, 17, 18, 40, 41, 43, 44, 45, 48, 50, 52, 53, 54, 56, 57, 59, 60, 63, 68, 69, 71, 72, 73, 74–81, 83, 88, 89, 93, 94, 95, 96, 109, 115, 117, 120, 122, 123, 124, 190, 222, 260, 277, 278; ii. 158, 231, 233, 337; iii. 288, 291
Plautus, iii. 185
Pliny the Elder, i. 118, 120, 121, 224
Pliny the Younger, i. 171
Plotinus, i. 167, 175; iii. 78
Pluche, ii. 65, 66
Plücker, iii. 163
Plutarch, i. 232
Poggendorf, ii. 374
Poisson, iii. 78
Politiano, Angelo, i. 216
Polyænos, i. 120
Polybios, i. 114
Pomponatius, Petrus, i. 220, 221–225
Porphyry, i. 175, 187, 190
Pouchet, Felix, iii. 14, 18, 50
Poussin, ii. 54
Prantl, i. 187, 188, 189, 209, 210, 214, 217, 225
Preyer, iii. 61, 204
Price, Richard, ii. 7
Prichard, iii. 106, 181
Priestley, i. 327; ii. 4, 7, 8, 9, 101, 206; iii. 189
Prillieux, iii. 73
Prodikos, i. 39, 56
Pröhle, i. 145
Protagoras, i. 6, 39–49, 54, 56, 59, 68, 75, 99, 109, 110, 287; ii. 157, 159, 276
Ptolemy, i. 118, 119, 120, 121
Puteanus, Eryceus, of Louvain, i. 258
Pythagoras, i. 33, 73, 109, 117, 120, 122, 124, 260, 278; ii. 158

Querard, ii. 57, 75
Quételet, ii. 259; iii. 194–199

Radenhausen, iii. 32, 36
Radicke, ii. 348, 350
Rames, iii. 94
Ramus, Petrus, i. 269; ii. 33
Raphael, iii. 183, 360
Raumer, ii. 144
Raymund, i. 245
Redtenbacher, ii. 368–370, 380
Reich, Edward, iii. 295, 296, 300
Reichel, i. 95, 97, 150, 168
Reichenbach, ii. 345
Reicke, iii. 323
Reid, ii. 8, 206
Reimann, ii. 36, 137
Reimarus, H. S., ii. 137, 140
Reimarus, J. A., iii. 178
Reinhold, ii. 194
Renan, Ernest, i. 175, 177, 178, 182, 218, 219, 220
Rhäticus, i. 230
Richardson, ii. 24
Richter, ii. 345, 358
Riemann, ii. 188; iii. 227
Ritschl, iii. 185
Ritter, i. 18, 130; ii. 236
Robinet, J. B., ii. 25, 29–31, 60
Rogerius, ii. 36
Rokitansky, iii. 229
Ronge, iii. 294, 297
Rönne, ii. 247
Rorarius, Hieronymus, i. 245, 258; ii. 134
Röschel, ii. 38
Roscher, i. 162, 163; iii. 257
Rose, ii. 3, 259
Rosenkranz, ii. 23, 24, 27, 31, 52, 95, 109
Ross, Alexander, ii. 36
Rothe, Richard, iii. 294
Rousseau, i. 110, 282; ii. 17, 52, 70; iii. 183
Roux, iii. 106, 107
Ruge, ii. 261

Sachs, iii. 73
Sanctorius, ii. 344
Sauppe, ii. 144
Scaliger, i. 114
Schaaffhausen, iii. 93
Schaller, i. 240, 254, 280; ii. 255; iii. 176
Scheitlin, ii. 135; iii. 136, 178
Schelling, i. 35, 236; ii. 29, 236, 237, 238, 256, 257, 275, 284, 303, 365; iii. 80, 319
Schiller, i. 10, 80; ii. 22, 27, 28, 81, 89, 142, 146, 147, 203, 232, 233, 235, 236, 238, 239, 242, 245, 257; iii. 102, 183, 291, 301, 304, 343, 345, 346
Schilling, ii. 124, 203, 212
Schleiden, ii. 155, 221, 229
Schleiermacher, i. 177, 188; ii. 8; iii. 352

Schlosser, i. 172; ii. 51
Schmerling, Dr., iii. 89
Schmidt, Oscar, iii. 52, 72, 108
Schöbl, iii. 179
Schömann, i. 6, 7
Schönbein, ii. 362
Schoner, i. 230
Schopenhauer, ii. 154, 256, 266, 267, 323; iii. 43, 32., 330
Schramm, H., i. 314
Schultze, Max, iii. 20
Schultze-Delitzsch, iii. 317
Schulze, F. H., iii. 180, 243
Schuppe, i. 188
Schwann, iii. 16, 17, 18
Scotus, Duns, i. 208
Scotus Erigena, i. 189, 191
Seguin, ii. 365
Seneca, i. 128, 131, 224; ii. 67, 83
Sennert, ii. 33
Seydel, iii. 154, 156
Sextus Empiricius, i. 176
Shaftesbury, i. 318, 319, 324, 325; ii. 19, 20–24, 27, 28, 146, 147
Shakespeare, i. 295
Sharp, ii. 75
Siebold, iii. 41
Sigwart, ii. 185
Sime, ii. 140
Simonides, i. 224
Sklarek, iii. 19
Smith, Adam, i. 295; iii. 234, 235, 260
Snell, i. 248, 315; iii. 109
Sokrates, i. 5, 17, 39, 40, 41, 43, 44, 45. 48, 53, 54, 55, 57, 60, 61, 62, 63, 64, 65, 66, 67, 70, 71, 72, 74, 76, 79, 80, 83, 84, 93, 94, 95; ii. 23, 24; iii. 289, 291
Sömmering, i. 119
Sophie Charlotte, Queen of Prussia, i. 326; ii. 127
Sophokles, i. 3
Spalding, ii. 6
Spallanzani, iii. 179
Spencer, Herbert, iii. 186, 187, 189–191, 363
Spicker, ii. 22
Spiller, ii. 322. 323
Spinoza, i. 12, 236, 242, 301, 323, 326; ii. 35, 36, 39, 55, 147, 148, 157, 226, 265, 304; iii. 32, 190, 311
Spieren, Von, ii. 6
Spir, iii. 336
Spurzheim, iii. 114, 115, 121
Stadler, iii. 69
Stahl, ii. 242, 334
Steenstrup, iii. 36
Steffens, ii. 346
Stephani, i. 6
Stephen, Leslie, i. 330
Stewart, Dugald, ii. 170, 171; iii. 186
Stilpo, i. 6
Stirner, ii. 255, 256
Stokes, ii. 385
Stosch, ii. 35
Strato of Lampsakos, i. 93, 94, 203; ii. 39, 45, 58
Strauss, David Friedrich, ii. 13, 19, 246, 260, 284, 289, 290; iii. 305, 306, 320, 323–334
Stricker, iii. 139
Stuarts, the, i. 272
Stumpf, iii. 187, 193, 216, 217
Sturm, ii. 144
Suetonius, i. 171
Sulla, i. 128
Swift, ii. 79
Sydenham, i. 318; ii. 78
Syrbius, ii. 37

Tacitus, i. 171
Tait, iii. 22
Tappert, ii. 144
Tardy, iii. 90
Tempier, Bishop Etienne, i. 208
Tertullian, i. 290
Tetens, iii. 171
Teuffel, i. 62, 130
Thales, i. 4, 8, 9, 114
Themistius, ii. 45
Theon, i. 120
Theophrastus, i. 6, 27
Thomas Aquinas, St., i. 205, 221, 322
Thomasius, Chr., ii. 145
Thomasius, Jenkin, ii. 135
Thomson, Sir W., ii. 385; iii. 21, 22
Thukydides, i. 272
Tiberius, i. 131, 171; iii. 264
Toeche, iii. 306
Toland, John, i. 324–330; ii. 90, 99, 100, 127, 273
Tomaschek, ii. 239
Toqueville, de, ii. 12
Torricelli, ii. 66
Tralles, ii. 137, 139
Trembley, ii. 72
Trendelenburg, i. 81, 188, 196, 211; ii. 154, 202, 212, 300; iii. 306
Tycho Brahe, i. 263; ii. 226
Tylor, Ed., ii. 186; iii. 182

Tyndall, i. vii.; iii. 10, 363
Twesten, Carl, ii. 154

Ueberweg, i. x. 9, 35, 85, 94, 108, 109, 170, 176, 187, 188, 192, 196, 205, 212, 237, 266, 313, 314. 322; ii. 32, 180–182, 247, 349; iii. 5, 209–211, 214–216, 224–226, 305–310–326, 328, 332
Uhlich, iii. 285
Uz, ii. 145

Vahlen, i. 226
Valerius Maximus, i. 15.
Valla, Laurentius, i. 216, 226
Valliss, iii. 322
Vanini, i. 225
Vaucanson, ii. 75, 230; iii. 111
Vesalius, iii. 247
Vierordt, ii. 349
Villonius i. 269
Virchow, ii. 285; iii. 38, 39, 146
Virgil, i. 129, 131
Vives, Luis, i. 217, 228, 237, 260; ii. 33; iii. 272
Vogt, Carl, ii. 259, 264, 284, 286, 298, 312; iii. 14, 16, 18, 26, 28, 39, 41, 85, 88, 96, 118, 346
Voit, ii. 350
Volger, iii. 261
Volney, ii. 80, 85, 87
Voltaire, i. 13, 174, 254, 267, 294, 296, 311, 327; ii. 11, 12–19, 23, 25, 30, 38, 39, 51, 52, 61, 88, 98, 103–106, 143; iii. 249, 292

Wachler, i. 181
Wagner, And., iii. 28, 30, 31, 106, 196, 197
Wagner, R., ii. 264, 285
Waitz, iii. 72, 106, 166, 182, 196
Wallace, iii. 48, 100
Weber, E. H., ii. 259
Weber, W., ii. 371, 384
Weihrich, ii. 355, 360, 372, 373, iii. 56
Weinkauff, ii. 36
Welcher, i. 6
Weller, ii. 37
Wernekke, i. 232
Westphal, ii. 38
Whewell, i. 11, 27, 114, 248, 306, 309, 310, 313, 314, 315, 317; ii. 170, 171, 172, 173, 174
Widmannstadt, i. 231
Wigand, iii. 34
Winckelmann, ii. 143, 144, 145, 146, 210
Winckler, ii. 37, 136
Wirth, Max, iii. 251
Wittstein, iii. 164
Wolf, F. A., ii. 144
Wolff, C., i. 197, 201; ii. 67, 133, 134, 136, 138, 145, 157, 196; iii. 170, 171
Wolff, P., ii. 47, 48
Worsae, iii. 90
Wren, Sir Christopher, i. 314
Wundt, iii. 127, 129, 144, 153, 154, 180, 204

Xenocrates, i. 99
Xenophanes, i. 33, 36
Xenophon, i. 41, 60, 63
Xerxes, i. 15

Young, ii. 363

Zedlitz, ii. 266
Zeller, i. 5, 7, 8, 10, 13, 15, 18, 24, 28, 30, 36, 39, 60, 72, 73, 94, 95, 97, 109, 110, 130, 150, 152, 168; ii. 33, 35, 50, 124, 125, 126, 239; iii. 325
Zeno, i. 98, 103
Zimmermann, ii. 54, 57, 139, 179, 181–183, 190
Zöllner, ii. 325, 326, 328, 388, 396; iii. 9, 10, 21, 22, 23, 24, 43, 44
Zopyros, i. 60

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